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OF

WASHINGTON.



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OF THE

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OF

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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON

VOL. X

MARCH-JUNE, 1908

Nos. 1-2

JANUARY 9, 1908.

The 218th regular meeting was held at the Saengerbund Hall, 314 C street, N. W. President Hopkins presided, and there were present Messrs. Barber, Bishopp, Burgess, Burke, Busck, Davis, Foster, Gahan, Hopkins, Jenne, Marsh, Patten, W. J. Phillips, Popenoe, Quaintance, Sanders, Sasscer, Schwarz, Townsend, Van Horn, Webster, and Weldon, members, and Messrs. R. A. Cushman, W. S. Fisher, Paul Hayhurst, E. O. G. Kelly, and D. K. McMillan, visitors.

President Hopkins was nominated to represent the Society as a Vice-President of the Washington Academy of Sciences. The following officers were elected for the year 1908: President, A. D. Hopkins, First Vice-President, Otto Heidemann; Second Vice-President, E. A. Schwarz; Recording Secretary, H. E. Burke; Corresponding Secretary, J. G. Sanders; Treasurer, J. D. Patten; additional members of the Executive Committee, Harrison G. Dyar, L. O. Howard, and C. L. Marlatt.

Thanking the members of the Society for his reelection Doctor Hopkins read and commented upon some portions of the address of the first president, the late Dr. C. V. Riley. Mr. Schwarz told of the difficulties of organization and the hardships endured by the members for the first few years.

—Mr. Davis presented the Society with Bulletin 234 of the

U. S. Geological Survey, which shows a number of interesting views of the effects of the San Francisco earthquake and fire. A vote of thanks was tendered Mr. Davis for this gift.

—Mr. Quaintance exhibited the larva and work of an undetermined species of apple miner. This larva forms very long, serpentine mines under the skin of the apple, greatly disfiguring the latter for sale on fruit stands and similar places. The injury permits of rapid evaporation of water in the fruit, and wilting soon begins along the course of the mine, which in a week or ten days may be very pronounced, rendering fruit practically worthless for usual market purposes. While the species has not been observed to be common, it might under favorable conditions become a pest of importance. During the present year apples thus injured were brought in from the Ozark Mountains by Mr. E. L. Jenne, and specimens of injured fruit were frequently found in a shipment of several barrels of apples from Niagara County, New York. The work of what is undoubtedly this same insect has been previously mentioned, and figured,* though from the cast head-skin found it was thought to belong to the genus *Lithocolletis*. The larva exhibited was taken from the mine, and the insect apparently winters in the larval condition. The adult has not yet been reared. The work of what is probably the same larva had been frequently noted on vigorous, growing shoots of apple, such as nursery stock and water sprouts of old trees. Specimens of twigs similarly injured have also been received from Dr. H. T. Fernald, from Massachusetts. A photograph taken by Mr. S. W. Foster, showing the mines on apples, was also exhibited.

Doctor Hopkins remarked that he had seen a similar injury in the skin of the orange at Nordhoff, Cal. The species causing it was said to be quite common there, and had inflicted some damage.

Mr. Busck, on examining the apple-mining larva, said that it belonged undoubtedly to the genus *Marmara* Clemens. The larva of one of the species of this genus makes similar peculiar mines just under the epidermis on shoots of willow in

* Bul. 10, n. s., Div. Ent., U. S. Dept. Agric., pp. 87-88, fig. 19.

the eastern States and Mr. Busck bred other species with identical habits on *Arbutus* from Seattle, Wash., and on *Opuntia* from Texas.

—Professor Webster presented the following paper:

NOTE ON ADISTEMIA WATSONI WOLL.

[Coleoptera, Lathridiidae.]

By F. M. WEBSTER.

Very little seems to be known of the habits of this diminutive beetle, and our literature is almost devoid of references to the species. Mr. E. A. Schwarz was the first to record its occurrence in this country, he having exhibited specimens of it under the name *Cartodere watsoni* and made some remarks upon it at a meeting of the Entomological Society of Washington held November 12, 1896.^a

The statement was made that it had first been observed in a sack of Lepidoptera from Alaska but that later it had occurred quite commonly in old flower pots about the buildings of the Department of Agriculture.

In his Revision of the Lathridiidae of Boreal America,^b Mr. H. C. Fall gave the American habitat as Washington, D. C., "in drugs," "in dust from feed store," and "among Alaskan Lepidoptera." The author made it the sole representative of his new genus *Adistemia*, and gave its distribution, outside of America, as Canaries, Algeria, Cape of Good Hope, Portugal, Venezuela, and Chile, and stated that the species was described in 1871 from individuals taken on the interior walls of a house in Funchal, Madeira.

While located at Morgantown, W. Va., Dr. A. D. Hopkins began the breeding of several varieties of timothy. On becoming connected with the Bureau of Entomology he brought from West Virginia some material which was turned over to the Bureau of Plant Industry and was planted on the experiment farm of the Department of Agriculture at Arlington, Va. As this timothy offered exceptional advantages for the study of *Isosoma*—with which some of it was badly infested—in July, 1905, some of the stems of these different strains of timothy were cut off close to the ground, brought in from the experiment farm, and soon after placed in sacks of swiss

^a Proc. Ent. Soc. Wash., Vol. IV, p. 52.

^b Trans. Am. Ent. Soc., Vol. xxvi, pp. 141-142, 1899.

and securely tied. These sacks were kept in the same room as several hundred others containing timothy and other grasses not only from about Washington but from most of the States east of the Rocky Mountains. They were not opened until May 16, 1906, nearly ten months afterwards, when great numbers of these beetles were found alive in the sacks from Arlington, but in none of the others. It is difficult to see how the beetles could have been introduced into these sacks in any other way than with the hay, and had they gained access thereto during the time the timothy was in storage it is difficult to see why they should not have entered other sacks also, but among the hundreds of boxes of grains and grasses they have not since been encountered.

It seems rather strange that we should, in our hundreds of experiments in breeding insects from other points in this immediate vicinity as well as from other States, have encountered this imported beetle but once, and then confined exclusively to these varieties or strains of timothy.

Specimens of the adult were exhibited.

Mr. Schwarz said that this beetle feeds on the various species of molds such as infest seed and herbarium specimens. Although described first from Madeira, it is now cosmopolitan, being found occasionally as a pest in herbaria. In regard to the published statement that it has been found "among Alaskan Lepidoptera" it should be noted that the baskets containing the Lepidoptera (some geometrid) wrapped up in papers, were detained at San Francisco for several weeks, and upon their arrival at Washington many of them were found to be infested by a mold, upon which the *Adistemia* was feeding.

Doctor Hopkins said that the food habit of these beetles was particularly interesting in this case, because it probably explained the apparently peculiar facts noted by Professor Webster. One of the varieties of timothy is known to be infested with a destructive fungous disease, and it is probably from this variety that Professor Webster obtained his specimens.

As an additional note, Doctor Hopkins stated that the varieties of timothy are differently affected by both diseases and insects, indicating that some are more susceptible to attack

than others. Observations on insect enemies of forest trees indicate that certain varieties of tree species are more resistant to their enemies than other varieties of the same species. These facts suggest that this is a subject which should receive detailed investigation in order that the practical value of varietal selection in preventing damage from insects may be determined.

—Mr. Burgess gave an interesting account of the Chicago meeting of the Association of Economic Entomologists and of the Entomological Society of America, and told of the founding and purpose of the *Journal of Economic Entomology*.

—Mr. Barber reported that he had just returned from a two months' trip to northeastern Wisconsin when the country was covered with snow and ice. No attempts were made to collect insects but a great deal of woodpecker work on the forest trees had been noticed.

—Mr. Schwarz called attention to the note lately published in *Entomological News* by Mr. G. C. Champion regarding the synonymy of the pepper weevil (*Anthonomus eugenii*), described by Dr. Donaciano Cano y Alcacia, in *La Naturaleza*, Volume II. No one could have been blamed for overlooking this original description. Professor Herrera has lately drawn attention to it in a small bulletin on the pepper weevil published in Mexico City. Several specimens, apparently coming from the original set, have just been received at the National Museum from Dr. A. Dugès. These completely lack the æneous luster of the upper surface. A similar disappearance of the æneous luster is noticed in the type specimens of *Anthonomus æneolus* Dietz, which are preserved in the U. S. National Museum. The same change of color can be noticed in a large lot of the pepper weevil collected two years ago at San Antonio, Tex.

In this connection Mr. Schwarz said that in the spring of 1907 he ascertained at San Antonio that in the early part of the season large quantities of peppers were annually introduced into the markets of San Antonio from Aguas Calientes, Mexico, and adjoining places; there is very little doubt, therefore, that *Anthonomus eugenii* was introduced into Texas.

An allied species, *Anthonomus mexicanus* Gyll., redescribed by Linell as *brevirostris*, occurs in southern Texas at Brownsville and Victoria, but never infests peppers and is unquestionably specifically distinct from *Anthonomus eugenii*. At present the pepper weevil has been reported as infesting only the fruit of the pepper, but it will probably be found to infest the blossoms just as the cotton boll weevil (*Anthonomus grandis* Boh.) infests the cotton flowers and squares.

FEBRUARY 13, 1908.

The 219th regular meeting was held at the Saengerbund Hall, 314 C street, N. W. President Hopkins presided and there were present Messrs. Barber, Barrett, Bishopp, Burgess, Burke, Couden, Currie, Hall, Heidemann, Hooker, Hopkins, Hunter, Jenne, Lawford, Marsh, Morgan, Patten, W. J. Phillips, Piper, Popenoe, Schwarz, Van Horn, and Webb, members, and Messrs. C. R. Ely, A. K. Fisher, E. O. G. Kelly, and E. W. Nelson, visitors.

Mr. W. M. Giffard, President of the Board of Commissioners of Agriculture and Forestry of Hawaii, was elected a corresponding member of the Society, and Mr. E. J. Kraus, of the Bureau of Entomology, U. S. Department of Agriculture, an active member.

The resignation of Prof. V. L. Kellogg from corresponding membership was presented and accepted.

Mr. Patten reported that the Washington Academy of Sciences had under consideration the publishing of a weekly bulletin which would give notices of meetings, programs, and other news of the various affiliated societies. Information was desired as to the number of members, dues, publications, etc., of the various societies. The corresponding secretary was instructed to furnish the desired information for the Entomological Society.

—Mr. Schwarz read the following note for Mr. Knab, who was at that time in Mexico:

SWARMING OF A REDUVIID.

[Hemiptera-Heteroptera.]

By FREDERICK KNAB.

The swarming of the males of nemocerous Diptera is a common and familiar phenomenon but I am not aware that such a habit has often been recorded for the Hemiptera. Late on the afternoon of January 4, 1908, when collecting in the outskirts of Córdoba, Mexico, I came upon a swarm of small insects, to all appearances Nemocera. It was at the intersection of two paths through the coffee groves, where the sun shone in obliquely. The insects were dancing in the sunlight in the open space in the manner of male Nemocera. They all faced in the same direction, just as do the Nemocera, in response to currents of air. The swarm consisted of several hundred individuals, weaving up and down among each other. When captured the insects proved to be a very small species of Reduviidae. Mr. Heidemann has determined the species as *Henicocephalus culicis* Uhler. A little later, at 4:30 p. m., at another intersection of paths, another swarm of the same insects was found, dancing in the sunlight. The swarm was larger than the first one and the insects moved more rapidly. When the sun disappeared behind some trees, a short time after, the swarm dispersed. I have not yet determined if the individuals in the swarm are all males, as is the case with the Nemocera.

Mr. Heidemann said that *Henicocephalus* (*Enicocephalus*) was erected by Westwood in 1837, but has been described by various other authors since then, under different names, on account of differences in the head and thorax which are now considered as only specific characters. The genus is cosmopolitan, but specimens are not common. Twenty-five species have been recorded. Six of these are from North America. The genus was based on the species *flavicornis* from St. Vincent, West Indies. He called attention to a note by Carlos Berg in the *Berliner Entomologische Zeitschrift*, Volume XXXVIII, 1893, p. 362, entitled "Lebensweise von Henico-

cephalus," where the swarming of this reduviid is recorded both on the island of Ceylon and in the Argentine Republic.

Mr. Schwarz stated that many years ago he caught a number of specimens of *Henicocephalus* near Washington. These were flying at or above the tips of some tall grasses at sunset. The type specimens of *H. culicis* Uhler were found by him among the débris under the reeds along the shore of Utah Lake, Utah. Under the same conditions these insects were found by Mr. Barber and himself along the warm creek at Hot Springs, Yavapai County, Ariz.

Mr. Barber said that he found either the same or another species under the bark of a dead oak in Tennessee and also, under the same conditions, in Dorchester County, Maryland. In both cases there were a pair of adults and a number of various-sized larvæ.

—Mr. Hooker presented two short notes, as follows:

INJURY TO OAK FORESTS IN TEXAS BY HETEROCAMPA MANTEO DOUBLEDAY.

[Lepidoptera, Notodontidae.]

By W. A. HOOKER.

In September and October, 1904, while in Lamar County, which borders upon the Red River in Texas, I observed a widespread injury to the oaks which make up a great part of the forest in this section. This injury was found to be due to what Professor Comstock has called the variable oak-leaf caterpillar, *Heterocampa manteo*. The injury was especially noticeable upon the post oaks, which appeared as if a fire had swept through them. It extended from Paris to the Red River some 15 miles to the North, and newspaper reports showed it to extend into Red River County to the East.

I have waited, hoping to visit that locality again, but as I have not had the opportunity, I wish to place this observation on record. In looking up the literature upon this insect I find that Professor Comstock in his report as Entomologist of the Department of Agriculture for 1880, page 259, states that during the season of 1880 a great amount of damage was done in at least two counties of Arkansas (Garland and Saline)

by the destruction of the foliage of the oak forests by this insect. This seems to be about the only report as to any extensive injury.

In passing through the forest near Paris, Tex., in 1904 the droppings, as they fell upon the dry leaves, reminded one of a heavy downpour. Large numbers of *Calosoma scrutator* were present, as many as a half dozen often being found beneath a single oak, and several individuals were observed coming down the tree trunks with caterpillars in their mandibles. An occasional *Calosoma calidum* was also noticed.

Packard, in his Monograph of the Bombycine Moths, Vol. I, page 224, gives the synonymy of this species and Doctor Dyar shows the differences between the larvæ of *Cecrita bilineata* Packard and *Heterocampa manteo* in *Entomological News* for 1893, pages 262-263.

AN OBSERVATION ON AGAPOSTEMON MELLIVENTRIS CRESSON.

[Hymenoptera, Apoidea.]

By W. A. HOOKER.

While at Eagle Pass, Tex., with Mr. J. D. Mitchell in October of last year (1907), I observed a peculiar condition in a species of bee which Mr. Crawford has determined as *Agapostemon melliventris* Cress. Males and females were found in large numbers on the blossoms of a species of rosinweed (*Silphium*). When collected they would fall or roll into the cyanide jar without attempting to fly, and if shaken off they would fly sluggishly to the ground.

Mr. Crawford informs me that the species of the genera *Agapostemon* and *Augochlora* are among the most easily disturbed of the bees and that they usually take flight upon approach. He has collected this species in Texas and found it to take flight as readily as others of the genus. It is a southwestern species, found as far north as Colorado, and originally described from the Territory of Nevada.

This condition could hardly have been due to cold, as the day was mild, though quite windy, and the sun shone throughout the afternoon while the collections were being made. It may possibly have been due to some effect which the nectar of this particular plant has upon the bees.

—Mr. Hooker also stated that while at Eagle Pass, Tex., in October, 1907, he collected three species of scales, *Ceroplastes cistudiformis* Towns. & Ckll., *Coccus hesperidum* L., and *Aulacaspis* sp., on mistletoe (*Phoradendron flavescens*) growing on mesquite in the Military Reservation at that place. *Ceroplastes cistudiformis*, according to Mrs. Fernald's Catalogue of the Coccidae of the World, has been reported from Mexico and California. The mistletoe furnishes a new food plant for the species.

Doctor Hopkins stated that the common references to the destruction of hardwood timber by defoliating insects were usually misleading. They give the impression that the trees are killed, when in reality it is only the foliage that is destroyed. His observations indicated that the first defoliation, or even a second or third annual defoliation, did not perceptibly affect the vitality of some species of deciduous trees, citing as an example a number of young pin oaks (*Quercus palustris*) on his farm in West Virginia, which had been repeatedly defoliated by *Lachnostenra* in May during the past ten years, and frequently some of them a second time the same season by *Anisota senatoria* Hbn., yet their vitality was not impaired, as evidenced by the rapid increase in size and their vigorous condition at the present time. The defoliation of other species of deciduous trees at a critical period in their life activity may prove disastrous, as shown by many of the willows along the Potomac, in the vicinity of Plummers Island, Maryland, which have died, evidently as the direct result of complete defoliation by sawfly larvæ in August. About the year 1892, thousands of locust trees (*Robinia pseudacacia*) died in West Virginia. After about the third successive year of destruction of the leaves in July and August by the locust leaf-beetle (*Odontota dorsalis* Thunb.) it was noticed that young sprouts and new leaves appeared on the trees late in the fall. This was followed by severe cold, 15° to 25° below zero, in December and January, and it was thought that the direct cause of death of the trees was due to the freezing following the abnormal condition of new growth as the result of defoliation.

Doctor Hopkins's observations indicated that one or two complete defoliations of coniferous trees usually resulted in their death, excepting the larch, which succumbs after the second or third defoliation.

Records of depredations by the "Nonne" moth (*Liparis monacha* L.) in the coniferous forests of Europe indicate that a vast amount of timber has died at different times during the past four hundred years as the result of defoliation and subsequent attacks by barkbeetles. Doctor Hopkins stated that his observations in this country indicate that coniferous trees defoliated by insects or injured by diseases of the foliage are not as attractive to barkbeetles and bark-boring insects as are those injured by lightning, deadened, or felled with the axe, or broken by storm.

Mr. Burgess said that defoliation in the fall often causes serious injury to nursery stock and larger fruit trees, for it causes the buds to start and thus results in winter killing. Mr. Hunter thought that the climatic conditions which follow the defoliation might have a great deal to do with its effects. Mr. Piper questioned the statement that defoliation is always fatal to coniferous trees and said that many yellow pine trees in eastern Washington and Idaho had recovered after complete defoliation by the pine butterfly (*Neophasia menapia* Feld.). Mr. Webb said he had observed this same condition in Idaho.

—Mr. W. J. Phillips read the following paper:

NOTES ON TOXOPTERA GRAMINUM AND PARTHENOGENESIS OF ONE OF ITS PARASITES.

[Hemiptera-Homoptera.]

By W. J. PHILLIPS.

Observations were made on the spring grain-aphis (*Toxoptera graminum* Rond.) at Richmond, Ind., from June, 1907, to December 11, 1907. During this period a number of interesting things came to light.

It was observed that *Toxoptera* molts but four times; and, even under the most favorable conditions, the period between

molts of the same individual varies greatly; not as much, however, as it does for different individuals. The following table shows these variations, each individual being subjected to the same conditions. Nos. A to E represent different individuals.

*Variation in the duration of the different instars in *Toxoptera graminum*.*

Individual.	From time of birth to first molt.		From first molt to second molt.		From second molt to third molt.		From third molt to fourth molt.	
	hrs.	min.	hrs.	min.	hrs.	min.	hrs.	min.
A	38	35	28	29	31	37	39	40
B	40	15	29	15	34	36	34	37
C	50	20	26	40	35	48	40	22
D	45		54		40		64	
E	44	30	32	35	36	50	39	37

There is also great variation in the time from the birth of individuals to the fourth molt and the appearance of the first young, as will be seen from the following table. Individuals in this table are same as in the preceding, with the addition of F and 1b⁸.

*Variation in the time from birth of individuals to fourth molt and appearance of first young, in *Toxoptera graminum*.*

Individual.	From time of birth to fourth molt.		From time of birth until first young appear.	
	hrs.	min.	hrs.	min.
A	143 to 144		144	35
B	143		148	
C	153		164	
E	153		165	
D	204		246	
F	195		205	
1b ⁸	170 to 175		175	(approximately)

From the above data it seems that there is no fixed period for the different molts or the appearance of the first young.

It was found that a temperature of 30° F. or below had the effect of lengthening the period between molts; also, of lengthening the period between generations. At the ordinary summer temperature, a generation is produced in from 6 to 11 days; in autumn the period varies from 14 to 48 days. A temperature of 8° F. does not kill the insects, but as soon as the temperature rises to from 40° to 50° F. they go on reproducing.

THE EGG-LAYING FORM.

Early in October winged males and egg-laying females appeared on blue-grass in the vicinity of Richmond, Ind. They were still abroad the 11th of December. Numbers were dissected and found to contain from 3 to 5 eggs. In December, while dissecting females breeding on blue-grass in an out-of-door cage, an individual was found containing 2 embryonic larvæ and 2 perfectly developed eggs. This is the second time this singular phenomenon has come under my observation.

BIRTH OF YOUNG.

Observations were made on the manner of birth of the young. Adult *Toxoptera* were taken from out of doors into a warm room and watched under a compound microscope. The young appeared to be enclosed in a delicate, membranous sac, from which they would free themselves, as a rule, before being dropped from the body of the mother. In several instances, however, they were dropped before having ruptured the sac at any point. In the latter case, they looked like perfectly developed pupæ before emerging from their cases. When dropped in this manner they seemed to expand and contract gently until the sac ruptured at the cephalic extremity. By this gentle expansion and contraction they would finally free themselves, leaving the sac crumpled and folded upon itself.

PARTHENOGENESIS OF LYSIPHLEBUS TRITICI.

From observations made at intervals during the summer it appeared that these parasites were parthenogenetic. In November experiments were begun in proving this point. These observations were made indoors at a temperature of 50° F. to 60° F. Seven virgin females were secured, each for a separate experiment, and placed in separate cages with *Toxoptera* known to be unparasitized. Each of the parasites began ovipositing in the *Toxoptera* in a few minutes. After one of the virgin females had ceased ovipositing in the *Toxoptera* she was removed from that cage and confined with a male, allowed to mate, and then transferred to another cage containing unparasitized *Toxoptera*. She soon began ovipositing in them. All these parent parasites were preserved.

Viviparous *Toxoptera* were used in the preceding experiment. *Lysiphlebus*, however, parasitizes the oviparous individuals also.

December 8, adult parasites issued from all the parasitized *Toxoptera*. Offspring of virgin females were males; offspring from the fertile female had predominance of females.

—Mr. Barber exhibited male, female, larvæ, and photomicrographs of *Ignotus enigmaticus* Slosson, which had been received from Mr. Blanchard and Mr. Joutel. He said that Mr. Blanchard had a fine series of drawings made by Mr. Joutel, which he hoped would soon be published. Mr. Schwarz stated that *Ignotus* is the first instance in the clavicorn series of Coleoptera where there are neither elytra nor wings in the female.

—Mr. Couden exhibited a specimen of the peculiar larva first described and figured by Mr. Barber in Volume VII, pages 117-121 of the PROCEEDINGS of this Society. Mr. Couden said that this specimen was found in the collection of the U. S. Department of Agriculture. It was sent in from California by Mr. Coquillett a number of years ago. When found, it bore the label "Nitidulid larva." Mr. Schwarz said that he did not believe that it was a nitidulid. Mr. Barber exhibited photographs and slides of his specimens.

—Mr. Heidemann exhibited some Hemiptera-Heteroptera sent him by Mr. J. R. de la Torre Bueno from New York. The specimens were not in good condition for examination, but they appear close to the European species *Stygnocoris rusticus* Fallen, and probably belong to that species. The genus *Stygnocoris* has not been recorded from North America before.

—The secretary then read the following papers by Mr. Ainslie:

TETRASTICHUS AS A PARASITE ON POLYGNOTUS.

By C. N. AINSLIE.

[Hymenoptera.]

The exact position of *Tetrastichus* in the field of parasitism has been the occasion of much discussion among students of insect economy. Certain investigators have claimed it to be in every case a secondary parasite, while others, with a different viewpoint, insist that, in the case of the Hessian fly at least, it is a primary enemy. Two species of *Tetrastichus*,

productus and *carinatus*, are listed by Professor Osborn in Bulletin 16, new series, Division of Entomology, U. S. Department of Agriculture, as parasitic on *Polygnotus*—that minute proctotrypid whose untiring hostility to the Hessian fly renders it an important factor in keeping the world's table supplied with bread.

Evidence in support of either contention is difficult to secure. Individuals reared from infested material prove as much for one side as for the other, since their presence is mainly inferential and their mission may be interpreted as the student may see fit. Clearly the only satisfactory solution of the problem is to see the *Tetrastichus* at work, if possible, and discover what it is doing. By a fortunate circumstance this has actually happened in at least one very interesting instance.

During the month of April, 1907, a large number of wheat plants containing Hessian fly larvae known to be infested with *Polygnotus* was transferred from Marion, Pa., to a field of wheat on the battlefield of Antietam near Sharpsburg, Md., where the fly was prevalent and where no *Polygnotus* had previously been found.

On July 8 of the same year this field was visited by Prof. F. M. Webster and Mr. E. G. Kelly, and a quantity of ripening straw containing numerous flaxseeds was gathered and sent to Washington. Examination showed that a large percentage of these flaxseeds contained *Polygnotus*, which seems to indicate that the imported parasites began operations as soon as they emerged from the Marion material in Maryland.

This infested straw, collected in July, remained dry in the office during the summer, and apparently no adults issued therefrom. About Nov. 15 I removed a number of the Hessian fly puparia, cleared them in carbol-xylol, and mounted them in balsam. The pupa case of the fly is quite dense in its structure, but the mounts gradually cleared in the balsam until the contents of the puparia became distinctly visible. The accompanying drawing (fig. 2) is a fair representation of the colony of *Polygnotus* that was in possession in many of these flaxseeds, although the number of included



FIG. 1.—"Flaxseed" or puparium of Hessian fly (*Mayetiola destructor*) showing two adult *Polygnotus*, and a hyperparasite, *Tetrastichus* sp.

adults varied from 3 to 12 or possibly more. Doctor Howard has called attention to the position of these parasites, heading, as may be seen in the illustration, toward the nearest end of

the pupa case. This rule has some exceptions, but seems to hold good in the majority of those examined. Many of these *Polygnotus* were living when these mounts were made, but those that remained in the straw all died before New Year's, possibly because of lack of moisture or on account of abnormal conditions generally.

Figure 1 illustrates a most unique example of hyperparasitism of the Hessian fly discovered in one of these mounts after they had cleared. Two perfect adult *Polygnotus* are to be seen within the pupa case, while beside them, lying in what is clearly a *Polygnotus* cell, is an adult *Tetrastichus*. The cells occupied by the *Polygnotus* are clear and free from débris, exhibiting only the black residue of matter remaining from the larval state. In the other cell with its strange guest, besides the same black residuum is a mass of débris or flocculent matter, extremely suggestive of a previous tenant.

FIG. 2.—Adults of *Polygnotus* which have developed within the "flaxseed," or puparium of the Hessian fly, *Mayeriola destructor*. (Drawing made in the Bureau of Entomology and published by permission of the Secretary of Agriculture.)



It is of course impossible to determine the species of this *Tetrastichus* nor can it be known if it was introduced with the *Polygnotus* from Pennsylvania, or if it made the attack from ground already occupied by it. In any event it plainly operates to the disadvantage of the farmer by lessening the army of *Polygnotus*, thus befriending the Hessian fly.

NOTE ON THE OCCURRENCE OF CAMPYLOMYZA. SCUTELLATA SAY.

[Diptera, Cecidomyiidae]

By C. N. AINSLIE.

I desire to record the discovery of a new habitat of a hitherto rare dipteron, *Campylomyza scutellata*.

While at Jefferson, Ohio, October 10, 1907, my attention was

attracted by swarms of a minute fly of a species that I had never noticed before. These flies abounded on certain wooden uprights in a clover and timothy meadow. They were exceedingly active and when disturbed would move to a new location and alight, but were constantly in motion while on the wood, running about in an apparently aimless manner.

A sweep of the net captured hundreds of them from the myriads present. The species was determined by Mr. D. W. Coquillett, who informed me that it had been reported from Missouri, but that no examples had been placed in the National Museum prior to those collected by myself. It may be of wide distribution, but its small size would prevent its being noticed unless occurring in the numbers I observed in Ohio.

Nothing seems to be known of its life history.

TENACITY OF LIFE IN *EVANIA URBANA* BRADLEY.

[Hymenoptera, Evaniidae.]

By C. N. AINSLIE.

An interesting instance of tenacity of life came under my observation in Washington during September, 1907.

An individual of that peculiar species of Hymenoptera, *Evania urbana*, while running about the office floor at 904 B street, S. W., met with the serious misfortune of losing its head by an accidental and wholly unintended movement of my foot. The catastrophe broke the neck of the insect neatly without at all bruising or crushing either the head or body. To help the poor fellow all I could I attached the completely severed head to the body by means of shellac, and laid the patient aside in a vial to see if the operation would prove successful. The decapitation occurred about 10 o'clock in the forenoon. That afternoon at 4:30 o'clock the insect was still alive, the feet were moving, and the antennæ waving with some animation, but there was no attempt at locomotion.

Next morning the body was apparently lifeless, for I could detect no motion of the tarsi, but there was still a slight motion of the antennæ, showing that the head retained its vitality longer than the body. About 10:30 I could see no movement, and it is probable that life became extinct about twenty-four hours after the tragedy took place. I have often observed an injured insect live longer than this one, but never one from which the head had been completely removed.

—Mr. Burke exhibited specimens of *Boros unicolor* Say, a beetle belonging to the family Pythidæ, which had been found by Mr. R. W. Van Horn on January 21, 1908, under the dead bark of *Pinus virginiana* at Glen Echo, Md. Mr. Schwarz said that this species belongs to the Boreal fauna and so its occurrence in the locality is only temporary. It probably comes down the Potomac River or by railroad with logs. Mr. Barber disagreed with this, because he had found the species several times at quite a distance from the river and railroads.

—Dr. Hopkins presented a note on a scolytid beetle, *Ips (Tomicus) decretus* Eichh., living in bark saturated with sea water, stating that while at Virginia Beach, Va., last November he found two pine logs on the sea beach which had been cast up by the waves. The bark on both of them was only partially dead and was found to be infested with broods of the bark-beetles. One log was found on November 20, which had certainly been cast up within a day or two; the other, found on the 28th, had been cast up during a storm on the 24th, or at least it was known that it had not been on the beach in that vicinity at any time within ten days previous to that date. The bark of both logs was thoroughly saturated with sea water when found, and repeatedly soaked by the tides. All stages of the insect were found in large numbers in the bark, and the matured adults were emerging and crawling about on the surface of the wood and bark. It was very evident that these logs had been floating about in the sea for some time before they were cast up by the waves and that the broods of the barkbeetles had been able to survive. It is evident that the parent beetles entered the bark and deposited their eggs before the logs got into the water, or possibly after they had been in the water and at a time when they were temporarily on the beach, since it is not likely that the beetles could enter the bark while the logs were in the water. When it is considered that it requires about thirty days for the broods of the barkbeetles to develop, it is evident that this or a longer period had elapsed since the logs were first infested. This power of a barkbeetle to live in water-soaked drift logs is of interest in showing their power of resistance to such conditions and how a species may

be thus distributed. The barkbeetle comes very close to a common European species, *Tomicus suturalis* Gyll., in fact appears to be more closely allied to it than to the common North American species, *Tomicus cælatus* Eichh.

Mr. Schwarz said that he had observed a similar habit of *Tomicus cælatus* at Old Point Comfort, Va. Four or five years after the construction of the Government pier, broods of this species were found under the bark of piling which were subject to the salt spray.

Mr. Burke remarked that he had observed at Kent, Wash., that Douglas spruce piling which had been in the salt water for several months was attacked by the scolytid *Gnathotrichus* sp. in preference to that freshly cut.

—The following paper was presented for publication:

NEW SPECIES OF BALANINUS, WITH NOTES.

[Coleoptera, Curculionidæ.]

By F. H. CHITTENDEN.

While studying the species of this genus in the preparation of certain papers on the nut weevils for publication by the United States Department of Agriculture, the writer experienced considerable difficulty in correlating the sexes of several forms. This difficulty increased by the accumulation of specimens received from correspondents who mistook the beetles for the boll weevil, as many of these did not agree with named specimens in the National Museum or with published descriptions. Accordingly the writer undertook to obtain acorns from various sources, especially from the South, for rearing. Mr. F. E. Brooks, who is also interested in the biological study of the genus, at the writer's suggestion preserved males and females found in copulation, and the receipt of sets of specimens from him, collected at French Creek, W. Va., has greatly facilitated the completion of this paper, begun some time ago. It should, perhaps, not be necessary to state that of all described forms of *Balaninus* two feed on chestnut, one on hickory and pecan, and one on hazel, the remainder being, so far as we know, all acorn feeders. In a paper published in 1897 Col. T. L. Casey* remarked that "the

* Coleopterological Notices, vii, Annals of the N. Y. Academy of Science, Vol. ix, p. 655.

species having short beaks in both sexes are numerous within the borders of the United States and have only been superficially elaborated thus far." In the paper cited 9 additional species are described. The present paper describes 5, and it seems probable, as surmised by Colonel Casey, that there are still more awaiting description; in fact, it was only for lack of sufficient material that some of the forms mentioned in the present paper were not described earlier.

Balaninus baculi, n. sp. (fig. 3).

Elongate ovate, strongly convex above, brownish piceous; head, rostrum, antennæ, and legs piceo-rufous. Vestiture scant; of lower surface and legs, composed of short pale-gray scales; of elytra, the same, with many small, moderately dull brown, inconspicuous scaly areas.

Head about one-half as wide as thorax, eyes separated by three-fourths their width, space divided by an impressed line terminating in a rounded puncture posteriorly. Rostrum ♀ a little less than three-fifths as long as the body, robust, of nearly uniform width, slightly widened at extreme base and apex, impunctate, nearly straight to anterior fourth or third, where it is more or less abruptly recurved; antennæ inserted just behind proximal third. Scape scarcely longer than first two funicular joints, first funicular a little shorter than second and third together, third scarcely shorter than second. Thorax one-fourth wider than long; sides strongly sinuous to apex, which is tubulate and emarginate; base subtruncate; disk moderately convex, densely, deeply and finely, and reticulately punctate. Elytra about one-

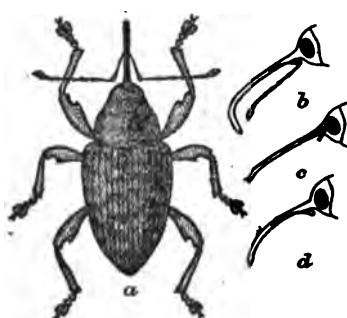


FIG. 3.—*Balaninus baculi*: a, Female beetle; b, head, rostrum, and antenna of typical female; d, head and rostrum of male; c, female of straight-beaked form. Four times natural size. (Original, U. S. Dept. Agr.)

half longer than wide, nearly three times as long as, and less than three-fifths wider than thorax; strongly rounded at humeri, sides arcuate, rapidly convergent to apex. Stria somewhat narrow and deep, with a single row of short white scales, with spaces between about equal to their own length. Intervals wide, moderately convex, rather finely and densely punctato-rugose. Scutellum nearly white, divided or entire. Lower surface with scaly covering sparse, scales mainly very short and whitish gray; fifth ventral segment deeply and widely concave at middle, with sides more than usually arcuate and rounded. Femora comparatively slender, teeth small, acute, with reentrant angle weak and rounded. Tibiae slender, sinuous.

Male.—Rostrum a little shorter than in ♀, moderately and nearly uniformly arcuate, more thickened at extreme base and distinctly punctate. Antennæ inserted at middle, scape about as long as first four funicular joints. Fifth ventral segment with a very small apical bare area, showing margin, and with a tuft of hairs each side. Pygidium with long tuft of yellowish hairs.

Dimensions.—Length, 5.5–7.5 mm.; width, 2.8–3.2 mm.; rostrum ♀ 3.5–4.0 mm., ♂ 2.8–3.5 mm.

Habitat.—Ithaca, N. Y. (Chittenden); Ann Arbor, Mich. (Hubbard & Schwarz); Kanawha, W. Va. (Hopkins); Allegheny, Pa. (Hamilton); New Jersey; Heyworth, Ill., Sept. 31 (Wolcott); Cook Co., Ills. (Blackwelder); Okoboji, Ia. (Wickham); West Point, Nebr.; Stonewall, I. T.; Jackson, Miss.; Memphis, Tenn.; Goldsboro, N. C. (O. Sutter); Pleasant Hill, Ala., Oct. 15 (J. B. Rudolph); Auburn, Ala., Oct. 18 (E. M. Wilcox).

Type.—No. 11996, U. S. National Museum.

The above description was drawn from a good series from Ithaca, N. Y. Specimens from other localities exhibit considerable variation as regards the rostral structure, which is seldom so abruptly recurved at the apex as in the type. This species is known in collections generally as "*uniformis*" and is sometimes labelled "*obtusus*".

Observed by the writer in copula and in great numbers on two trees of *Quercus alba*, always in company with *Balaninus quercus*, at Ithaca, N. Y., September 1–8. Taken by Dr. A. D. Hopkins in West Virginia on yellow oak, *Quercus velutina* (*tinctoria*). It also infests the acorns of other oaks, including most biennials.

***Balaninus baculi* var. *curtus*, n. var.**

Series from Texas and Florida, including reared material from Boerne, Tex., differ considerably from the northern forms, appearing to be deserving of a varietal name, particularly as they breed true to their own type. This form differs from typical *baculi* in its smaller size, wider elytra, and paler colored scales. The rostrum is proportionately and very distinctly shorter and more slender and not so abruptly recurved at the apex, frequently being nearly straight.

Length, 5.7–7.0 mm.; width, 2.7–3.2 mm.; rostrum, ♀ 3.0–3.2 mm.; ♂ 2.5–2.7 mm.

Habitat.—Boerne, Tex. (G. Schattenberg); Kaufman, Terrell, Atlanta, Dallas, Tex.; Crescent City, Fla. (Hubbard & Schwarz); Fort Drum, Fla. (A. Fredholm). Reared from acorns of *Quercus velutina*, furnished by Mr. Schattenberg, and of *Q. rubra* collected by Mr. C. R. Jones.

Type.—No. 11998, U. S. National Museum.

Balaninus uniformis Leconte.

Balaninus occidentis Casey, Ann. N. Y. Ac. Sci., ix, 1897, pp. 658-659.

Comparison of all available material from California—including specimens of both sexes from Colonel Casey's type localities, Santa Cruz and Sonoma counties, Cal., and specimens identified by Mr. Frederick Blanchard by comparison with Leconte's types at Cambridge—with the description cited leaves practically no doubt that *occidentis* is a synonym of *uniformis*.

In the National Museum collection there are also specimens from Los Angeles, Mt. Wilson, Catalina Island, Humboldt County, Palo Alto, and Dunsmuir, Cal. There is also a small series collected by Messrs. Hubbard and Schwarz at American Fork, Utah, June 23.

It might be added that this species is clothed with ochreous scales, not gray as with *baculi*, previously described; also, that it is the only species of its genus recognized from the Pacific Coast States.

Balaninus q.-griseæ, n. sp.

Moderately robust, piceous, somewhat depressed; rostrum, antennæ, and legs rufous; vestiture of dorsum yellowish brown, hairy, of lower surface composed of elongate hair-like pale-gray scales; elytra with large, very variable, subtransverse pale fasciæ, appearing gray by contrast with the darker brown general color.

Head with a distinct, smooth interocular line. Rostrum ♀ three-fifths as long as body, slender, of uniform width, slightly elevated at extreme base, moderately arcuate, rather more so toward apex; antennæ inserted behind basal fourth, scape short, about as long as the first two funicular joints, first funicular long, second and third subequal. Thorax a little wider than long, basal half with sides parallel. Elytra moderately narrowed toward apex; striæ deep and wide, intervals rather strongly convex. Legs of moderate length, femora of posterior pair not extending beyond elytra, tooth large and conspicuous. Fifth ventral segment of ♀ strongly impressed in nearly the middle third.

Male.—Rostrum a little less than half as long as body, curvature similar to ♀; stout, much enlarged at base, scales covering nearly half from base to antennal insertion; antennæ inserted at or considerably behind middle; scape shorter than first three funicular joints. Last ventral segment and pygidium with yellow hairs forming a tuft extending beyond elytra.

Dimensions.—Length, 6-7 mm.; width, 2.8-3.2 mm.; rostrum ♀, 3.6-4.0 mm., ♂ 2.9-3.2 mm.

Ft. Grant, Ariz., reared from acorns of *Quercus grisea* received from H. K. Morrison, July 26, 1882. Oracle, Ariz., June 29-July 9; Sta. Rita Mts., Arizona, June 13-26; Williams, Ariz., June 30, on *Quercus gambelii* (Barber & Schwarz).

Type.—No. 11555, U. S. National Museum.

Allied to *strictus* and *longipes*, from which it may be readily separated by its much shorter legs and antennal scape, and interocular line. The coloration is variable, some specimens being almost reddish brown, with very distinct paler bands, others being nearly uniform brown or gray, while still others are gray, with yellowish thorax and a few yellow transverse bands.

Balaninus victoriensis Chittenden (fig. 4).

Balaninus victoriensis Chitt., Bul. 44, Div. Ent., U. S. Dept. Agric., 1904, p. 31.

Body moderately slender, black, except antennæ and claws which are rufous; rostrum black, or partly piceous. Vestiture dense, composed of gray or, exceptionally, pale ochreous scales, fine and short, shorter on lower surface. Elytra finely mottled with slightly elevated, brown, pubescent scaly spots.

Rostrum ♀ four-fifths as long as body, moderately, nearly uniformly arcuate, very slightly enlarged at extreme base and at apex, basal fourth somewhat strongly punctate. Antennæ inserted in apical fourth, scape as long as next $2\frac{1}{2}$ joints, second funicular joint three-fourths as long as first, one-fourth longer than third. Femora strongly clavate, tooth very large and prominent, apex produced, reentrant angle nearly right, a little oblique.

Male.—Rostrum not exceeding one-half the length of the body, slightly more arcuate and enlarged at either extremity, antennæ inserted at or slightly behind middle. First and second ventral segments concave; fifth strongly narrowed, with a median, nearly bare concavity in apical half and with long apical hairs at sides.

Dimensions.—Length, 5.0-7.0 mm.; width, 2.4-3.6 mm.; rostrum, ♀ 3.8-5.5 mm., ♂ 2.8-3.5 mm.

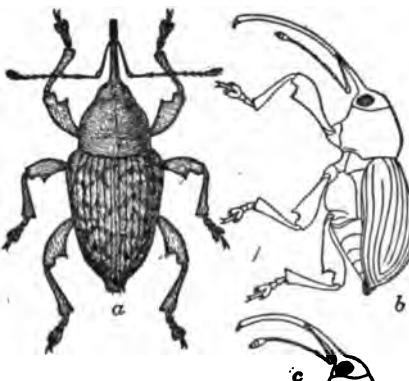


FIG. 4.—*Balaninus victoriensis*: a, Female beetle; b, same in profile; c, head, rostrum, and antennæ of male. Four times natural size. (Author's illustration, U. S. Dept. Agr.)

Habitat.—Victoria, Tex. (type locality); Cypress Mills (coll. Chittenden), Boerne (G. Schattenberg); Dallas (Crawford et al.); Terrell (Hinds); Arlington, San Antonio (Pratt), and Chico, Texas.

Reared by the writer from acorns of *Quercus virens* and *Q. velutina* furnished by Mr. G. Schattenberg, Boerne, Tex., August 19 to Oct. 4, 1906. Also reared by Hon. J. D. Mitchell from *Q. macrocarpa* at Victoria, Tex.

The above description is somewhat elaborated from that previously published in Bulletin No. 44 (l. c.) and the illustration is from the same source.

Balaninus parvidens, n. sp.

Dark piceous, antennæ and sometimes rostrum rufous. Vestiture dense, composed of fine, pale-yellowish squamules, nearly hairy on dorsal surface, much shorter and wider below; elytra variegated with rather small, pale-brown spots.

Rostrum ♀ strongly and nearly equally arcuate, only three-fifths as long as body, scarcely enlarged at base and faintly at apex, antennæ slender, inserted near base, between the basal one-fourth and one-fifth; scape shorter than first two funicular joints. Elytral humeri prominent, striæ narrow, with few scales. Fifth ventral segment nearly triangular, moderately tufted at extreme apex. Femora moderately clavate, with posterior teeth not prominent and reentrant angles feebly rounded.

Male.—Rostrum one-half as long as body, antennæ inserted perceptibly behind the middle. Fifth ventral segment with feebly concave, sometimes nearly bare median area with a small tuft of long yellow hairs each side and a longer pygidial tuft.

Dimensions.—Length, 6.0-7.0 mm.; width, 2.8-3.2 mm., rostrum, ♀ 3.3 mm., ♂ 3.0 mm.

Habitat.—Victoria, Tex., September and October (W. D. Hunter); Dallas, Tex. (F. C. Bishop); Jamison, Ala., November 24 (J. W. Sorrell); Centreville, Fla. (Hubbard & Schwarz); Agricultural College, Miss. (H. E. Weed).

Type.—No. 11554, U. S. National Museum.

Bears a superficial resemblance to yellow forms of *victoriensis*, having the same type locality, but easily separated by the rostral, antennal, and femoral structure. The general effect is more uniformly pale yellowish than in any *victoriensis*.

Balaninus pardalis, n. sp.

Robust, piceous or subrufous; antennæ, rostrum, and legs rufo-testaceous. Vestiture very dense, bright ochraceous; elytra strongly mottled with small brown spots or less closely united and forming bands.

Rostrum ♀ four-fifths as long as body, stout, moderately arcuate, more strongly in apical half, distinctly enlarged at base and at apex; a faint carina and punctuation barely indicated at extreme base; mandibles large and conspicuous, antennæ inserted in apical third, scape as long as next three joints. Thorax one-fourth longer than wide, strongly arcuate near middle, rapidly narrowing toward apex. Elytra three-fourths as wide as long, comparatively wide toward apex, striæ very fine. Femora not extending beyond elytra, strongly clavate, tooth large and prominent, reentrant angle nearly right. Fifth ventral segment concave in median third.

Male.—Rostrum less than two-thirds as long as body, a little more strongly arcuate than in ♀, enlarged at either extremity; mandibles very large; antennæ inserted well behind the middle. Fifth ventral segment flat at middle, strongly bilobed at apex; pygidium produced into a *closed* tube of long hairs.

Dimensions.—Length, 6.0–7.5 mm.; width, 2.8–4.0 mm.; rostrum, ♀ 4.0–5.0 mm., ♂ 3.5–4.0 mm.

Habitat.—Washington, D. C., June 3, September–October 1 (E. A. Schwarz and others); Rosslyn, Va. (Chittenden); La Plata, Md. (E. R. Sasscer); Allegheny, Pa. (Hamilton); Colemanville, Pa. (F. C. Pratt); Spring Lake Beach, N. J., Aug. 29 (Chittenden); Sandy Hook, N. J., New York, N. Y. (M. L. Linell); Berkeley, R. I. (H. C. Fall); French Creek, W. Va. (F. E. Brooks); Winston, N. C. (N. H. Willard); Rison, Ark. (W. J. Hollis); Eudora and Little Rock, Ark.; Victoria, Tex., Sept. 29.

Type.—No. 11553, U. S. National Museum.

In collections this species has been placed with *nasicus* and *quercus*, from both of which it differs by the shorter and thicker rostrum, with its enlarged apical extremity in the male. From the former also it can be distinguished by the shorter femora and more distinctly spotted character of the elytral vestiture, *nasicus* being marmorate. Another important character by which it may be separated from *quercus* is in the male, in which the abdomen is not produced into an open tube of hairs.

A large series shows considerable variation from the type as regards length of rostrum and scape and color. Pale individuals are frequently found as with other species.

This species has been reared in abundance by the writer from acorns of *Quercus bicolor*, *velutina*, and *pedunculata* at Washington, D. C., collected by various associates, and from *Quercus alba* collected by Mr. F. C. Pratt at Colemanville, Pa. Mr. Brooks writes that he has taken it abundantly at French Creek, W. Va., on *Q. alba* also, and, rarely, on *Q. prinus*.

It is somewhat singular that the species should have escaped notice for so long a period, since it is represented in most of the extensive collections of Coleoptera.

Balaninus orthorhynchus, n. sp.

Body slender, piceous or rufous, antennæ and base of rostrum more distinctly rufous. Vestiture dense, composed of pale yellowish squamules, finer on dorsal, much shorter and wider on lower surface. Elytra wide at base, strongly acuminate to apex; striae of moderate width, with few scales; vestiture variable, nearly uniformly yellow or with pale brown spots of variable size.

Rostrum ♀ nearly straight, arcuate at extreme apex, of about the same length as the body and of uniform width; antennæ ♀ inserted near base at about the basal fifth, scape about the same length as the first two funicular joints. Fifth ventral segment subtriangular, strongly concave in medial third, slightly tufted at extreme apex. Legs long. Femora feebly clavate, posterior teeth small, acutely produced distally, reentrant angles rounded.

Male.—Rostrum moderately arcuate, very short, scarcely half as long as the body; antennæ inserted slightly behind the middle. Fifth ventral segment with a small, partially denuded medial area in apical half.

Dimensions.—Length, 6.2-7.5 mm.; width, 2.8-3.2 mm.; rostrum, ♀ 6.5-7.0 mm., ♂ 3.0 mm.

Habitat.—French Creek, W. Va., collected by Mr. Fred. E. Brooks on *Quercus rubra* and *coccinea*, and other biennial oaks; Texas (Coll. C. V. Riley); 4 females, 2 males.

Type.—No. 11556, U. S. National Museum.

The rostrum of the female is more nearly straight than in any other long-beaked species of the genus, which character alone will distinguish it. It has otherwise somewhat the appearance of a small *B. quercus*, with which it is evidently nearly related.

Balaninus caseyi, n. nom.

Balaninus brevirostris Casey, Ann. N. Y. Ac. Sci., ix, 1897, pp. 662, 663.

Colonel Casey's name is preoccupied by Pascoe's *B. brevirostris* from Landana, Congo, South Africa (Jour. Linn. Soc. Zool., Vol. xix, p. 331, 1886).

—The following paper, in the absence of the author, was read by title:

**ON THE CLASSIFICATION OF THE CORYDALINÆ, WITH
DESCRIPTION OF A NEW SPECIES.**

[Neuroptera, Sialidæ.]

By NATHAN BANKS.

While examining the new species described below I became interested in some points of venation which distinguished it from our common species of *Chauliodes*. This led to an investigation of all the forms available, with the result of finding several new characters for the distinction of the various genera.

***Neohermes humeralis*, n. sp.**

Jet black; head from middle of eyes back to prothorax bright reddish, except a blackish spot around ocelli; extreme base of wings bright yellowish, rest of wings blackish, the costal area to pterostigma paler; venation black; no other markings. Head rather long and narrow; antennæ at base but little if any farther apart than are the posterior ocelli, slightly serrate beneath in male; posterior ocelli fully three times their diameter apart; vertex with about three or four elongate elevated areas each side; pronotum distinctly longer than broad, sides parallel. Wings moderately slender; cells of costal area mostly longer on the subcosta than broad; first fork of cubitus starting away at a very acute angle; anal vein with two branches, both strongly geniculate, the two anal cells subequal in length, the lower giving off two veins, the upper without any; no cross-vein between first branch of anal vein and last branch from anal cell.

Expanse, 76 mm.

Two specimens from Santiago, Chile (M. J. Rivera). Professor Rivera kindly gave me also two specimens of *Chauliodes cinerascens* Blanchard.

A comparison of these with our United States species has led me to propose other characters than those now in use for the separation of the various genera allied to *Chauliodes* and *Corydalis*. One of the principal distinctions formerly in use was the comparative abundance of cross-veins in the wings; this was scarcely usable, as there is a great amount of variation in this matter. The presence of the tooth on the side of the head behind the eyes is more easily used, yet one can hardly consider it a character of great value. The venation of the various genera is extremely similar, except in the anal region. In most of the forms the anal vein forks but once, but in these two Chilean species, in several of our native species, and in those species placed by Doctor van der Weele in the genera

Hermes and *Protohermes* the anal vein has two forks. As this point is readily observed I shall consider it the first in distinguishing genera.

The forking of the branches of the median vein is very useful, as pointed out by Mr. Davis,* but in some specimens the fork is very close to the margin and only in one branch. There is another point in venation which is very suggestive; that is the number of cross-veins between the radius and radial sector. All the American forms have but three (in one wing of one *Neuromus hieroglyphica* I find four), while in the Oriental forms there are five, six, or more, perhaps occasionally but four, except in the true *Chauliodes* (*C. japonicus*, *C. diversus*) which have but three cross-veins. One can not apply this point as of prime importance since it would widely separate otherwise closely related forms, as for example the Oriental and American *Corydalis* and *Neuromus*.

The genera I recognize may be tabulated as follows:

TABLE OF GENERA OF CORYDALINÆ.

1. Anal vein of fore-wings with but one fork..... 4
Anal vein with two forks; anal cells subequal in length; the lower with two branches, the upper with none..... 2
2. A cross-vein between the first branch from the anal vein and the last branch from the anal cell; costal cells broader than long; antennæ much nearer eyes than ocelli; branches of median vein forked; more than three cross-veins from radial sector to radius.. 3
No such cross-vein present; antennæ about as near ocelli as to eyes; cells of costal area about as long as broad; branches of median vein not forked, three cross-veins from radial sector to radius.
Neohermes.
3. Ocelli small, the median twice its diameter or more from the others *Herkes.*
Ocelli large, the median about its diameter or less from the others.
Protohermes.
4. A distinct tooth on margin of head behind each eye; antennæ nearer to eyes than to ocelli, last tarsal joint about as long as basal; at least one branch of median vein forked; pronotum longer than broad; upper anal cell with one branch..... 5
No such tooth on margin of head behind each eye; antennæ as near mid-ocellus as to eyes; branches of median vein simple; pronotum usually as broad as long; radial sector connected to radius by only three cross-veins, upper anal cell with 2 veins or one forked vein

* Bul. 68, N. Y. State Museum, p. 452, 1903.

5. Labrum deflected; clypeal margin toothed; cross-veins in apical part of wing numerous *Corydalis*.
 Labrum horizontal, partly covering mandibles; clypeal margin not so distinctly toothed; cross-veins in apical part of wing less numerous *Neuromus*.

6. Anterior ocellus small, round, more than twice its diameter from the posterior ocelli; costal cells about as long as broad; black species. *Nigronia*.
 Anterior ocellus large, transverse, not twice its long diameter from the others; gray, mottled species. *Chauliodes*.

Neohermes, n. gen.

This new genus is proposed for such species as have the anal vein with two forks, the anal cells subequal in length, the lower with two veins, the upper with one, and no cross-vein between the first branch of the anal vein and the vein from anal cell. The costal cells are about as long as broad, and the antennæ are as near to the ocelli as to the eyes; the branches of the median vein are simple, and there are but three cross-veins from radial sector to radius.

The type is *N. filicornis* Banks (sub *Chauliodes*). This genus includes also *Chauliodes californicus* Walker, *C. angusticollis* Hagen, *C. cinerascens* Blanchard, and *N. humeralis* Banks.

Hermes Gray.

This genus is restricted to a few forms closely allied to the type species, *H. maculipennis* Gray. This is the only species of this genus that I have examined. There are five or six cross-veins from the radial sector to the radius.

Protohermes van der Weele.

In spite of their pale coloration the species of this genus are extremely closely related to *Hermes*. I have examined only *albibipennis* Walker, *anticus* Walker, and *grandis* Thunberg. These have five or six cross-veins from radius to radial sector, and at least one branch of median vein is forked.

Corydalis Latreille.

The most important character for the distinction of this genus is the strongly deflected labrum, and the corresponding development of the clypeal margin with teeth. *Acanthocorydalis* van der Weele may rank as a subgenus, having a spine on head and more than three cross-veins between radius and radial sector.

Neuromus Rambur.

This genus, of which *N. testaceus* Rambur is the type, is rather variable in appearance; the larger species show an approach to *Corydalis*, while the smaller species look much like *Protohermes*. I have examined *N. testaceus*, *N. intimus* McLachlan, *N. latratus* McLachlan, and the three American species, *hieroglyphicus* Rambur, *soror* Hagen, and *corripiens* Walker; these latter may be placed in a subgenus—*Chloronia*—having but three cross-veins from radius to radial sector, and branches of median vein forked only near tip.

Nigronia, n. gen.

This genus I erect for the two black-winged species found in the Eastern States, *serricornis* Say and *fasciatus* Walker, distinguished as indicated in the table. The habits of the adult flies is quite different from that of the typical *Chauliodes*. This genus bears the same relationship to *Chauliodes* that *Protohermes* does to *Hermes*.

Chauliodes Latreille.

In this genus I have examined our two species, *pectinicornis* Linnaeus, and *rastricornis* Rambur, *C. diversus* Walker from New Zealand and *C. japonicus* McLachlan from Japan. In *C. diversus* the pronotum is longer than broad; and in this and *C. japonicus* the costal cells are as long as broad.

It may be well here to add some points wherein the Sialinæ differ from the Corydalinæ. In *Sialis* there are no ocelli; the 4th tarsal joint is bilobed; the basal tarsal joint is about twice as long as the apical (subequal in the Corydalinæ); the anal and cubital veins of fore-wings are both simple (forked in Corydalinæ); the upper branch of radial sector sends a few branches to the costal margin (very rarely one in the Corydalinæ). There are three cross-veins from radius to radial sector as in many Corydalinæ.

NOTES ON A FEW APPARENT CASES OF SYNONYMY IN LEPIDOPTERA.

By HARRISON G. DYAR.

Kodiosoma fulva Stretch.

New synonym, *Kodiosoma otera* Barnes, Can. Ent., xxxix, p. 10, 1907.

The female type agrees in general with the female of the variety *tricolor*, the border of the hind wings being narrower,

the band of the fore wings broader and more curved. Considering the range of color in *fulva*, I think that *otera* can not maintain specific rank, perhaps not even varietal.

Eubaphe ostenta Hy. Edwards.

New synonym, *Holomelina calera* Barnes, Can Ent., XXXIX, p. 10, 1907.

Doctor Barnes's type is a female, and differs from the ordinary female of *ostenta* in having the black border of the hind wings broken down a little on the inner side and the costal red shade of fore wings extended to the outer margin. These are accidental variations, not indicating even a variety. I have perfectly normal specimens from the same locality as the type of *calera*.

Erastria nigellus Strecker.

New synonym, *Erastria immuna* Smith, Ann. N. Y. Acad. Sci., XVIII, p. 124, 1908.

Mr. Merrick has kindly given me a specimen of *Erastria immuna* Smith, which was described from his collections. It agrees well with a careful pencil drawing of Strecker's type of *Epizeuxis nigellus*, which is before me, and I think it probable that Professor Smith has redescribed the Strecker species in another, more correct genus. I therefore follow his generic placing.

Timora toralis Grote.

I recently published some notes on *Botis toralis* Grote, showing that it was a noctuid, and referring it to the subfamily Acronyctinæ. A re-examination shows that the species has distinct spines on the legs and should be referred to the Agrotinæ. A specimen was sent to Sir George Hampson at the British Museum, who places it in the genus *Timora* Walker (*Rhodosea* Grote), where it will form the second North American species.

Homohadena terminellus Grote.

New synonym, *Homohadena candida* Smith.

The receipt recently of some specimens from Mr. F. C. Pratt in Texas labelled *Adipsophanes terminellus* Grote made obvious the above synonymy. *Terminellus* was previously unknown to me, but I recognized in Mr. Pratt's specimens *Homohadena candida* Smith, a type of which is before me. On reading Grote's description, I have no doubt but that Mr.

Pratt's identification^a is correct. The longitudinal black stripe is absent in *terminellus*, but present in my type of *candida*. It is evidently of no specific value, however. I adopt Professor Smith's generic reference as the more recent and therefore probably the better. The species has apparently a still earlier name in *Axylia vitrina* Walker, specimens of which from Jamaica, before me, agree rather closely with our Texan species, but I have some hesitation in referring our species definitely to the insular form.

Perigea roxana Druce.

Mamestra roxana Druce, Biol. Cent.-Am., Lep. Het., II, p. 476, 1898.
New synonym, *Perigea lucetta* Smith.

The species occurs at various points in Mexico and extends its range into Colorado, whence it was described by Professor Smith, two years later than Druce's description. I have six specimens before me of *roxana* from Orizaba and Jalapa, Mexico, and the male type of *lucetta* from Colorado.

Papaipema pterisii Bird.

Papaipema pterisii Bird, Can. Ent., XXXIX, p. 310, 1907.
New synonym, *Gortyna triorthia* Dyar, Can. Ent., XI, p. 79, 1908.

In determining my species to be new, I had overlooked Mr. Bird's description of *pterisii*, although I supposed I had read the descriptions of all his species. Later Mr. Bird sent me a cotype, among others, to be deposited in the National Museum, and I at once recognized my species, but not in time to prevent the synonym.

Hadena patina Harvey.

New synonym, *Dipterygia minorata* Barnes, Can. Ent., XXXIX, p. 13, 1907.

Doctor Barnes's type is before me, and is the dark form of *patina* in which the fore wings are almost wholly black. The species is recorded from the District of Columbia, Texas, and Mexico; I have specimens from Florida, and Dr. Barnes's record adds Arizona, as would be expected.

Lophoceramica artega Barnes.

Tricholita artega Barnes, Can. Ent., XXXIX, p. 64, 1907.

I propose the new generic term *Lophoceramica* for *Tricholita artega* Barnes, the genus being allied to *Ceramica* Guen.,

^a In a letter recently received Mr. Pratt refers the identification to Dr. Wm. Barnes, through Mr. Lacy of Texas.

and differing chiefly in the hairiness of the eyes. In *Ceramica* the eyes are densely hairy throughout, in *Lophoceramica* only on the posterior half. The genus should find place in Sir George Hampson's fifth volume on page 447. The females have a large white tuft covering the end of the abdomen. *L. artega* is closely allied to a Mexican species, *L. pyrrha* Druce (*Hydracia pyrrha* Druce, Ann. & Mag. Nat. Hist. (6), XIII, p. 359, 1894), but is probably sufficiently distinct therefrom to preserve its specific identity, at least until a larger series of *artega* has been obtained. I have before me the female type of *artega* and a male and two females of *pyrrha*.

Cœnipeta bibitrix Hübner.

New synonym, *Eubolina meskei* Hy. Edwards.

This common Mexican species occurs also in Texas, on the testimony of Hy. Edwards's type, which is in the National Museum. The species is extremely variable, but I have a specimen from Coatepec, Mexico, that exactly matches Edwards's type. Specimens in the Schaus collection extend the range to Brazil and Cuba. References to the species will be found in the *Biologia* (1, p. 350).

Petrophora iduata Guenée.

New synonym, *Xanthorhoe planata* Taylor, Can. Ent., XL, p. 59, 1908.

Mr. Taylor proposes a new name for the American form of *P. fluctuata* L., but fails to indicate why the name *iduata* Guen. should not be used. *Iduata* was described from two males from Canada and the name and reference are given plainly in Bul. 52, U. S. National Museum in the synonymy of *fluctuata*. Admitting Mr. Taylor's contention that the American and European forms are specifically distinct, I think Guenée's earlier name should be employed.

Odontoptila siculodaria Schaus.

New synonym, *Pigia albiserpentata* Pearsall, Sci. Bul., Brookl. Inst. Mus., I, p. 212, 1906.

Mr. Schaus's type is from Oaxaca, Mexico, but agrees well with specimens from southern Arizona, Baboquivari Mts., Arizona, and Brownsville, Tex.

Campometra cinctipalpis Smith.

New synonym, *Campometra mascara* Schaus, Ann. Mag. Nat. Hist., (7), VIII, p. 42, 1901.

Mr. Schaus's type is before me and extends the known range of our Texan species to Venezuela. I have six specimens from

Brownsville, Tex., very variable, but of a characteristic specific habitus. The Venezuelan specimen is not extreme.

Percnoptilota fluviata Hübner.

New synonym, *Plemyria mortuaria* Schaus.

I have not found the place of description of Mr. Schaus's species, but his type is before me from Castro, Parana, Brazil. It is a normal male specimen of this widely distributed insect. Mr. Warren has labelled a male specimen *Orthonana obstipata* Fab., which apparently gives us a still older name for our species.

Hydriomena latirupta Walker.

New synonym, *Plemyria paranensis* Schaus, Trans. Am. Ent. Soc., XXVII, p. 273, 1901.

Mr. Schaus's type is a male of normal appearance. The female specimens in the collection are labelled *Plemyria fluviata* Hüb.; this confusion no doubt accounts for Mr. Schaus having renamed these forms. This species thus appears to be likewise very widely spread.

Gelasma masonaria Schaus.

Nemoria masonaria Schaus, Journ. N. Y. Ent. Soc., v, p. 161, 1897.

New synonym, *Chlorochlamys volantaria* Pearsall, Sci. Bull., Brookl. Inst. Mus., I, p. 214, 1906.

Described from Mexico; Arizona specimens are not distinguishable. The reference to *Gelasma* Warren I find in the list of the Schaus collection, and is to be attributed to Mr. Warren, I believe.

Synchlora cupidenaria Grote.

Racheospila cupidenaria Grote, Can. Ent., XII, p. 218, 1880.

New synonym, *Synchlora louisa* Hulst.

Grote's species was sunk as a synonym of *Racheospila lixaria* Guenée, and subsequently described as new in another genus by Doctor Hulst. I have specimens compared with Grote's type in the British Museum by Mr. Schaus and Hulst's type of *louisa* before me.

Racheospila ocellata Stoll.

Phalaena Geometer ocellata Stoll, Suppl. Cramer's Pap. Exot., pl. XXXIV, fig. 9, 1791.

New synonym, *Racheospila xysteraria* Hulst, Ent. Amer., II, p. 121, 1886.

This species enters our region in southern Florida, whence it was redescribed by Doctor Hulst. It is widely spread in the tropics.

Racheospila centrifugaria Herrich-Schaeffer.

Geometra centrifugaria Herrich-Schaeffer, Corr.-Blatt. zool.-min.
Ver. Reg., xxiv, p. 182, 1870.

New synonyms,

Geometra protractaria Herrich-Schaeffer, Corr.-Blatt. zool.-min.
Ver. Reg., xxiv, p. 182, 1870.

Eucrostis hollandaria Hulst, Ent., Amer., II, p. 122, 1886.

Eucrostis jaspidea Hulst, Ent. Amer., II, p. 122, 1886.

Synchlora viridipurpurea Hulst, Can. ent., XXX, p. 159, 1898.

This species is common to Cuba and southern Florida. The markings vary remarkably; the white spot above anal angle may be absent or replaced by a large black blotch.

Racheospila sitellaria Guenée.

Racheospila sitellaria Guenée, Spec. Gen., IX, p. 374, 1857.

New synonyms,

Geometra congruata Walker, Cat. Brit. Mus., XXII, p. 511, 1861.

Iodis indeclararia Walker, Cat. Brit. Mus., XXII, p. 541, 1861.

Synchlora louisa var. *hulstiana* Dyar, Proc. Ent. Soc. Wash., IV, p. 457, 1901.

Originally described from Haiti, but occurs through the West Indies and in southern Florida.

Phorodesma niveociliaria Herrich-Schaeffer.

Eucrostis niveociliaria Herrich-Schaeffer, Corr.-Blatt. zool.-min.
Ver. Regensb., xxiv, p. 182, 1870.

New synonym, *Eucrostis saltusaria* Hulst, Ent., Amer., II, p. 122, 1886.

Another of the green geometers common to Cuba and southern Florida. The reference to *Phorodesma* Boisd. is due to Mr. Warren, whose label in the Schaus collection is so written.

MARCH 5, 1908.

The 220th regular meeting was held at Saengerbund Hall, 314 C street, N. W. In the absence of the president, First Vice-President Heidemann presided. There were present Messrs. C. N. Ainslie, Barber, Burke, Currie, Dyar, Howard,

Hunter, Jenne, Johnson, Kraus, Marsh, Morgan, Piper, Quaintance, Schwarz, and Van Horn, members, and Messrs. Geo. G. Ainslie, Paul Hayhurst, and Albert Mann, visitors.

Mr. Charles R. Ely, of Gallaudet College, Kendall Green, Washington, D. C., was elected an active member.

—The first paper on the program, "A New *Tetranychus*" by Mr. Nathan Banks, was read by title. It is as follows:

A NEW TETRANYCHUS.

[*Acarina, Tetranychidæ.*]

By NATHAN BANKS.

Tetranychus opuntiae, n. sp.

Color wholly bright red. Body rather more elongate than usual; with the usual bristles, but all very long, those on shoulders more than one-half width of body, none of them on tubercles. Palpi long, penultimate joint ending in a stout spur overlapping in part the next joint, thumb with a very stout finger, truncate at tip and bearing a hair on each side, one of them very stout, and on upper side of thumb a slender finger. The mandibular plate long, tapering somewhat to the rounded tip, which is not emarginate in the middle. Legs large and long, and having very long bristles; femur I about twice as long as tibia I, and tarsus I nearly as long as femur, the large mid-dorsal bristle of tarsus I as long as the joint; claws four-cleft.

This species occurs on prickly pear cactus (*Opuntia*) in Texas; it was collected by Mr. D. Griffiths of the Department of Agriculture, mostly near San Antonio, in March. It is very injurious to the cacti.

The following paper, in the absence of Mr. Knab, was read by the secretary:

THE EARLY STAGES OF SAYOMYIA PUNCTIPENNIS SAY.

[*Diptera, Culicidæ.*]

By FREDERICK KNAB.

Sayomyia punctipennis appears to be the most common species of its genus in the upper Mississippi Valley and al-

though the larva has been frequently alluded to it has, up to the present, remained uncharacterized. A few larvæ of this form were taken by the writer at Urbana, Ill., on October 2, 1904, in a temporary puddle, where they were associated with numerous larvæ of *Culex pipiens* and a few of *Culiseta consobrinus*. In confinement the larvæ of *Sayomyia* preyed upon the young larvæ of *Culex*, and from one that pupated the imago was disclosed October 10.

The larva of this small species resembles very much the larvæ of the other species of *Sayomyia* in general appearance. When the larva apprehends danger it sinks slowly to the bottom, maintaining throughout its horizontal position. The writer has also observed this maneuver in the larvæ of other species of the genus and in those of *Corethra* (*Mochlonyx*). Dr. Fr. Meinert, in his work "De eucephale Myggelarver," has already noted this action of the larva, without, however, offering any explanation of the manner in which it is accomplished. When suddenly disturbed the larva changes its position very rapidly by a switching motion in which the two extremities are brought nearly together.

A few more larvæ of the present species were obtained on Nov. 8 when dipping for *Culex* larvæ in Salt Fork, a small stream on the outskirts of Urbana. In February, 1905, more larvæ were obtained by some university students from a pond known as Crystal Lake, formed by the damming of the above mentioned stream. When a hole was cut through the ice these larvæ rose to the surface.

This species is the "*Corethra larva*" alluded to by Dr. S. A. Forbes in several of his writings, as the writer ascertained by an examination of the material in the collection of the Illinois State Laboratory of Natural History. From the data accompanying this material it appears that the larva of this species frequents the open water of lakes and rivers. Two plankton hauls from the Illinois River in mid-stream at Havana, Ill., August 12 and October 14, 1896, contain specimens of this larva. Other specimens, from Cedar Lake, Ill., taken October 23, 1882, are those referred to by Doctor Forbes in his articles, "*Leptodora in America*" (Amer. Naturalist, 1886, p. 1057) and "*The Lake as a Microcosm*" (Bul. Peoria Sci. Assn., reprint, 1887, p. 8).

Although closely similar to other species, the larva of *Sayomyia punctipennis* possesses distinctive characters in the form of the leaf-like appendages of the ventral surface of the head and in other structural details. Behind the eighth abdominal segment a pointed hood-like flap projects back-

ward. This may perhaps be present in the larvæ of other species, as it would be easily overlooked in such transparent larvæ. A more detailed description follows:

Larva.—Length about 8 mm. Form (fig. 5) elongate, broadest at the thorax and gradually tapering to the slender terminal segment. Air



FIG. 5.—*Sayomyia punctipennis*: Larva, dorsal view.

vesicles present in the thorax and seventh abdominal segment. Body entirely colorless and transparent. Antennal bristles and mouth parts pale yellow-brown; foramen of head tinged with brown; eyes black; air vesicles with round, closely approximated, dark-brown pigment spots.

Head (fig. 6) rather small, broadest at the eyes. Eyes situated behind the middle, large, compound, with an emargination behind to receive the small accessory eye. The head is prolonged anteriorly into a process which bears at its extremity the closely approximated anten-



FIG. 6.—*Sayomyia punctipennis*: Head of larva.

næ. This process about equals in length the head itself; at its base it is about a third as broad as the greatest width of the head; near the middle it is much narrowed by the concave sides. Antennæ inserted close together at the extremity of the process, directed downward. They are of a single stout elongate segment bearing at its tip six tapering slightly curved spines. Of these spines four are of nearly equal length with the antennal segment and one is a third

shorter than these, while the sixth spine is small and very short. Inserted ventrally, just behind the antennæ, is a pair of pendant appendages about equal in length to the antennal segment. Each of these appendages consists of five long filaments united at the base. About midway between these and the maxillæ are delicate pendant organs termed "leaflike appendages" by Dr. E. P. Felt (N. Y. State Mus., Bul. 79). In the present species these leaflike appendages are extremely long and slender and their length is about two thirds that of the antennal segment. Beyond the base these appendages expand into a small lamellate portion which remains quite small and again tapers into the very long and slender point. The anterior margin of the appendage gives rise to a series of long rays and on the posterior margin the basal fourth is unarmed while beyond are a succession of these slender spines. The maxillæ are long, stout and prominent, projecting downward just in front of the mandibles. Outwardly, near the front margin at about the middle, there is a slender spine. Near the apex of the maxillæ there is a group of coarse setæ. The mandibles are large, stout and prominent, concave on the inner side and with six long, stout, curved teeth on the apical margin; on the outer surface there is a coarse spine inserted above the teeth. At the base, on the inner surface, is inserted a dense tuft of long hairs. The labial palpi are represented by tubercles bearing a stout, long spine.

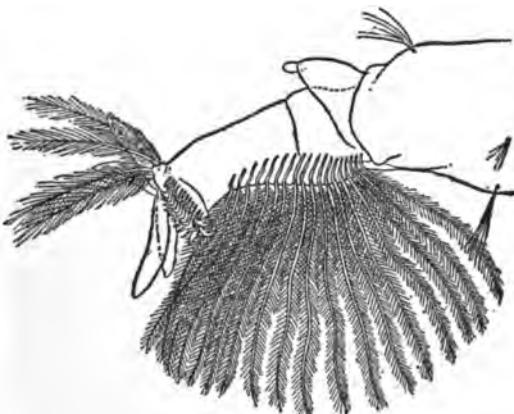


FIG. 7.—*Sayomyia punctipennis*: Terminal segment of larva.

The thorax is elongate, hexagonal; the three segments fused. The air-vesicles, at its posterior third, are short and rounded, obtusely pointed in front. First abdominal segment shorter than the succeeding ones. Air-vesicles of the seventh abdominal segment small, rounded. Thorax and abdomen with several series of delicate, white, sensory

hairs, mostly stellate. Basally a portion of the ninth abdominal segment is strongly constricted off into what appears to be a short, distinct segment; projecting over this, from the hind margin of the eighth segment, like a hood, is a triangular fleshy flap with its tip prolonged into a knob. Anal segment (fig. 7) elongate and slender; on each side, close to the posterior margin, a very regular row of strongly curved spines, about twelve in each row; below these are the ventral hooks which are short and each with two nearly equal teeth. Ventral rudder of 18 or 19 long, coarse, unbranched ciliate hairs. The four anal gill-flaps are rather small, elongate. Dorsally the anal segment bears at its tip two long, straight, plumose setæ, and curving over these another pair of plumose hairs.

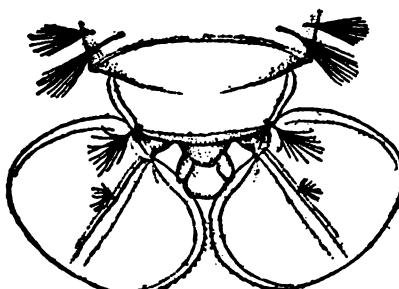


FIG. 8.—*Sayomyia punctipennis*: Tip of abdomen of pupa.

the posterior margin. Paddles (fig. 8) broader than long, inserted well apart and directed obliquely outward; the approximating margins with minute serrations.

The pupa floats below the surface of the water and maintains itself in a perpendicular position, the abdomen extended straight downward. When disturbed it darts about by strokes of its abdomen with amazing rapidity. The pupa, like the larva, is colorless. The air bladders of the anterior pair are distinctly visible in the pupa, in the lower part of the thorax, but they are not pigmented. When the larva approaches the pupal period the pigment spots of the air-vesicles break into irregular groups, leaving spaces between them, and the pigment is probably removed in the process of pupation.

In discussing this paper, Doctor Dyar said that the food habits of the *Sayomyia* in the open lakes were not known, but that the larvæ were very destructive to other mosquito larvæ in puddles near Washington.

—Doctor Dyar presented the following papers:

NOTES ON THE SPECIES OF ACROBASIS, WITH DESCRIPTIONS OF NEW ONES.

[*Lepidoptera, Pyralidae, Phycitinae.*]

By HARRISON G. DYAR.

Mr. Charles R. Ely, of Washington, D. C., recently left with me a box of pyralids collected by himself, among which were some *Phycitinae*. These contained such a fine series of *Acrobasis* (over half of the specimens being of this genus) that I was induced to review the species listed in the genus. The species of *Acrobasis* Zeller have a raised ridge of scales near the base of the fore wings; the males have a small projection on the basal joint of the antennæ and, in some species, various tracts of modified black scales on the under-side of the wings. Doctor Hulst, in reviewing the genus (*Trans. Am. Ent. Soc.*, xvii, p. 123, 1890), casts doubt on the specific value of these black markings, but for myself, I believe in them entirely, as they are not variable in the several species. They are secondary sexual characters, of as much importance as the projection on the antennæ, which Doctor Hulst uses for generic definition. While I think that these characters ought not to be used as generic, there is certainly no doubt of their specific value. I would base the separation of the species primarily upon them, as in the following table. In several instances species are indistinguishable as imagines, but have dissimilar larval habits and food plants. These are bracketed in the table. No attempt should be made to identify species without male specimens, much less to found new species on such material. Two species, *cirroferella* Hulst and *fructetella* Hulst, are unknown to me and not identifiable from the descriptions.

TABLE OF THE NORTH AMERICAN SPECIES OF ACROBASIS ZELLER.

Fore wing of male beneath with a small black dash at base of costa.

Hind wing of male with black markings below.

Hind wing with two black streaks, one subcostal, the other on median vein.

Subcostal black streak from base to beyond middle.
angusella Grote.

Subcostal black patch oval, not reaching base.
demotella Grote.

Hind wing without the black streak on median vein, the subcostal one present.

Fore wing with a black subcostal streak below from base to middle *nigrosignella* Hulst.

Fore wing without such a streak.

Hind wing with a black streak from base to beyond middle *eliella* Dyar, n. sp.

Hind wing with an oval black spot on middle of costa, *stigmella* Dyar, n. sp.

Hind wing of male without black markings beneath.

Fore wing of male below with a black subcostal streak from base to beyond middle *caryivorella* Ragonot.

hebescella Hulst.

evanescenella Dyar, n. sp.

Fore wing of male without such a streak.

Fore wing white from base to beyond middle (male, female) subcostally, cutting the inner line.

kearfottella Dyar.

Thorax and base of fore wing white *palliolella* Ragonot.

Thorax and base of fore wing gray *nebulella* Riley.

Fore wing of male beneath without black sex-marks.

Fore wing modified, the cell broad, veins 4-5 from a point distant from veins 2-3 *malipennella* Dyar, n. sp.

Fore wing of male normal.

Scale ridge of fore wing (male, female) edged with orange-red or brown outwardly *latifasciella* Dyar, n. sp.

normella Dyar, n. sp.

Scale ridge edged with dark red *rubrifasciella* Packard.

comptoniella Hulst.

Scale ridge edged with dull clay-color or gray,

carya Grote.

betulella Hulst.

Acrobasis angusella Grote.

I have but a single specimen of this, a female bearing Dr. C. V. Riley's number 376, *Acr. juglandis*, Hickory, June 12, 1871, also Doctor Hulst's identification label, *Acrobasis angusella* Grote. Mr. Grote's separation of this and the following species (*Papilio*, 1, p. 14, 1881) is pertinent and can not be improved upon.

Acrobasis demotella Grote.

Four specimens are before me: A male, New Brighton, Pa., June 5, 1902 (H. D. Merrick); three females, Tryon, N. C., May 28, 1903 (W. F. Fiske); 2 miles west of St. Louis, Mo., June, 1904 (Aug. Busck); the third presumably from Chicago,

Ill., but labelled only "3" (A. Kwiat). The food-plant still remains unknown.

Acrobasis nigrosignella Hulst.

I have a single specimen that I refer to this species, Tryon, N. C., May 7, 1904 (W. F. Fiske). Ragonot refers the name as a synonym to his *minimella* (Mon. Phyc. Gall., I, p. 105, 1893), but I can not concur in this view. *Minimella* Ragonot should rightly have no standing, being described from a female only, and from its size, markings, and locality I refer it to *nebulella* Riley (see below).

Acrobasis eliella, n. sp.

Head and thorax gray, with a reddish shade; abdomen gray, the segments ringed with whitish. Fore wing gray, shaded with red at the base, the scale-ridge black, extending half way across the wing, resting on inner margin; beyond it a broad orange-red band, narrowing toward costa and followed by a black shade on the costal half; discal dots joined; outer line mesially exserted, slender, denticulate, with an oblique inward shade from its upper angle, followed by a red shade. Hind wing gray. In the male there is a broad black streak on the hind wings below from base to beyond middle, approaching the costa at its end. Expanse, 19 mm.

Four males and six females East River, Conn., August 20, 1906 (Chas. R. Ely).

Type.—No. 11547, U. S. National Museum; three specimens in Mr. Ely's collection. Named in honor of Mr. Charles R. Ely.

Acrobasis stigmella, n. sp.

Head yellowish white on face and vertex, the palpi tipped with white; collar white in the middle, the rest of the thorax dark purplish gray; abdomen yellowish gray, ringed with dark at the bases of the segments, the basal segments brown dorsally. Wings purplish gray, the basal space very dark, the scale ridge scarcely darker, followed by a narrow obscure reddish shade; discal dots small, separated; outer line whitish, not strongly relieved, excurved in the middle, dentate, surrounded by a darker purplish shading. Hind wings pale gray with a yellowish tint. In the male there is a black subcostal streak on the fore wings below and an elongate oval patch close to the costa of hind wing below before the middle. Expanse, 19 mm.

Two males, one female, bred from larvæ on hickory, Fort Lee, N. J., May, 1896 (H. G. Dyar); one female, East River, Conn., August 20, 1906 (Chas. R. Ely).

Type.—No. 11548, U. S. National Museum.

The larvæ web up the three leaflets at the end of a leaf and form a mine in the stem where they are attached, or web up a little leaf and burrow in the young wood. They occur only in the young, unfolding leaves. The larva is cinereous green, the head, cervical shield, and thoracic feet shining black; anal plate brown. The body tapers abruptly at both ends. Tubercles small, brown, the hairs long, black; thoracic segments with three annulets, abdominal ones with two, the tubercles normal, iv and v closely approximate, i and ii nearly in line.

Acrobasis caryivorella Ragonot.

I refer to this species a male and a female from the Texas Agricultural and Mechanical College Insectary, July 12 and 20, 1903 (A. C. 225); a female, Burnet Co., Tex. (F. G. Schaupp through W. D. Kearnott), and two males, East River, Conn., August 8, 1906, and September 2, 1907 (Chas. R. Ely).

Acrobasis hebescella Hulst.

Six specimens from Brownwood, Tex., bred at the Insectary of the U. S. Department of Agriculture from larvæ on pecan mining into the young buds; one specimen, East River, Conn., August 2, 1906 (Chas. R. Ely). The species is very close to *caryivorella* Rag., but differs in the obsolescence of the outer line, all the space beyond the scale ridge being nearly uniformly cinereous.

Acrobasis evanescentella, n. sp.

Entirely similar to *A. caryivorella* Ragonot, somewhat darker in color. The specific difference lies in the sex-mark of the male, which is pale gray, overlaid by gray scales, not deep black and distinct as in *caryivorella*; the mark is also narrower.

Twelve specimens, Orlando, Fla., bred from larvæ on pecan by a correspondent of the U. S. Department of Agriculture; breeding No., Chittenden, 250.

Type.—No. 11981, U. S. National Museum. Seven of the types deposited in the National Museum, the rest with Doctor Chittenden.

Acrobasis kearfottella Dyar.

Besides the types, I have seen a specimen from New Brighton, Pa., now in the collection of Mr. F. A. Merrick, to whom I returned it. The species is larger and stouter than the following, though in general similar.

Acrobasis palliolella Ragonot.

Ragonot and Hulst place *albocapitella* Hulst in the synonymy of this species, correctly, I presume, though I have seen neither

of the types. I have ten specimens in the collection under this label, Palatka, Fla., on pecan, issued May 27, 1903; Olustee, Fla., June, 1904; Black Jack Springs, Tex. (through Dr. Wm. Barnes); Cairo, Ga., issued June 6, 1903; Blacksburg, Ga., on pecan, issued May 28, 1902 (W. R. William); Washington, D. C., on walnut, issued June 7, 1903 (Aug. Busck); Chicago, Ill., July, 1900 (Coll. W. D. Kearfott). The specimens possess the white thorax and base of fore wings, but the white is more or less grayish and grades into the color of the following species. I expect it will be found that *palliolella* is not more than a variety of *nebulella* Riley. They differ in no other respect.

Acrobasis nebulella Riley.

This name is listed as a variety of *Mineola indigenella* Zeller, but Riley's type before me is clearly an *Acrobasis* and differs from *palliolella* only in the gray color of thorax and base of fore wings. *Minimella* Rag., made to replace Hulst's *nigrosignella* by Ragonot and referred to the synonymy of *caryæ* Grote by Hulst, will find place here as a synonym. It was described from females and so can not be positively referred, but it contradicts this species in nothing, and its small size favors the reference as this is the smallest species before me. Ragonot's figure agrees well with specimens of *nebulella*, and the locality is consonant. I have 23 specimens before me, 4 bred by Doctor Riley on hickory and walnut, including the type of *nebulella*; Atlanta, Ga. (W. M. Scott); Texas (Jacob Boll), this specimen submitted to Ragonot by Riley in 1886 and marked "Acrobasis, too poor to name"; also submitted to Dr. Hulst in 1900 and labelled "probably *Mineola nebulella*," Kerrville, Tex., at light, May 30 to June 1, 1906 (F. C. Pratt); Blackshear, Ga., on pecan, issued June 12, 1902 (Dept. Agr., No. 8637); Rhinebeck, N. Y., July 27, 1888 (H. G. Dyar), the latter a female and the reference therefore less certain.

Acrobasis latifasciella, n. sp.

Agrees entirely with the description of *A. eliella* above; the same words might be repeated. It differs, however, in lacking all traces of sexual markings on the wings beneath in the male.

One male, New Brighton, Pa., Aug. 4, 1903 (H. D. Merrick); three males and one female, Plummers Island, Maryland, July 9, August 3, and 10 (Busck, Schwarz, and Barber); one female, June 22, 1886, bearing the number 2504 (presumably Doctor Riley's) and determined by Hulst as *Acro-*

basis caryæ. Mr. Ely has two specimens taken near Washington, D. C., by himself.

Type.—No. 11549, U. S. National Museum.

The Riley notes, preserved at the Department of Agriculture, contain under the number 2504 two entries, Kirkwood, Mo. (Miss Murtfeldt) and Virginia (Pergande), the larvæ on hickory in both instances.

Acrobasis normella, n. sp.

The pattern and colors are the same as in the allied species, but the orange-red space beyond the scale ridge is narrow and there is an oblique white shade from beyond the end of the scale ridge to the costa at inception of the outer line, relieving the small, separate discal dots strongly. The male has no sexual markings beneath. *Expanse*, 19 mm.

One male and one female, East River, Conn., August 2, 1907 (Chas. R. Ely).

Type.—No. 11550, U. S. National Museum.

Acrobasis rubrifasciella Packard.

I have several specimens under this label, but am not certain of any of them, as none is bred. The food plant is alder. Specimens not bred can not be distinguished from the following species:

Acrobasis comptoniella Hulst.

I have a series of specimens bred from sweet fern at Center Harbor, N. H. (H. G. Dyar). The larvæ have the head dark red, black in the sutures; cervical shield pale reddish, contrasting; body blackish, with broad diffuse dorsal and lateral pale reddish bands; feet black. The tubercles are minute and inconspicuous. Mr. Ely has a large series captured at East River, Conn. He says that the sweet fern is abundant at that locality.

Acrobasis caryæ Grote.

Ten specimens are before me, bred from pecan at the Inspectorate of the Department of Agriculture under the number 5023, from Summerton, S. C., and three others somewhat doubtfully referred, as the food plants are not known. Without the food plant, this species is indistinguishable from the following. The larval habits of the two seem different enough, for while *caryæ* eats into the young buds of hickory, *betulella* feeds on the leaves of birch later in the season, forming a hard ball of excrement surrounded by a loose web.

Acrobasis betulella Hulst.

On black birch, Maine, July 18-23, 1887 (A. S. Packard); two, Center Harbor, N. H., larvae on birch, June 24, 1902, adult July 9, 1902 (H. G. Dyar); larva in web on birch, Platte Canyon, Colorado, June, 1901, adult, July 1, 1901 (H. G. Dyar); five, bred from Birch, Sisson, Cal. (A. Koebele); one, bred from white birch, Hampton, N. H., July 9, 1906 (S. A. Shaw). The Californian specimens are a shade paler and smoother than the Eastern specimens, but do not greatly differ; the Coloradan specimen is as dark as the Eastern ones.

Acrobasis coryliella, n. sp.

A single male specimen before me, scarcely distinguishable from *coryæ* and *betulella*, but labelled "Phycita on Hazel, June 14, 15, 1876. No. 96" in a handwriting which may possibly be that of Doctor Lintner. It bears also Grote's determination "*Acrobasis rubrifasciella*." The food plant indicates a different species and the moth also is grayer, more uniform, without white shading, the outer line more distinct and finely crenulate. Mr. Ely has kindly given me three specimens from East River, Conn., that seem the same but have no record of food plant. Their dates are August 6 and 11.

Type.—No. 11551, U. S. National Museum.

Acrobasis malipennella, n. sp.

Head and thorax cinereous, tinged with coppery red; abdomen dark gray, the segments whitish at their tips. Fore wing short and broad, the cell broad, veins 2 and 3 arising close together, 4 and 5 from a point distant from them; gray, the scale ridge black, reaching half way across the wing, followed by a red shade and a black triangular cloud on costa; median field whitish frosted toward costa, enclosing a single black discal dot near the costal edge; outer line obsolete. Hind wing with the lower angle of the cell produced, veins 4 and 5 stalked; uniformly dark gray. Expanse, 13 mm.

One male, East River, Conn., August, 1907 (Chas. R. Ely). A second specimen is possibly the female of this species, but its wings are long and narrow as usual, while the venation is normal; the color resembles that of the male specimen, but the outer line is visible, mesially exserted, crenulate, outwardly pale, followed by a dark red shade; discal dots double, separate, black.

Type.—No. 11552, U. S. National Museum.

The male is easily distinguished by its peculiar short wings; the female, if rightly associated, has the wings of normal

shape and resembles *A. normella* Dyar. It is redder than that species and without the conspicuous white mesial shading.

Acrobasis sp.

Two females before me differ from anything in the collection, but may await the discovery of the male before being named. They are very dark gray, the scale ridge slender and slight, the following light shade very narrow, orange-red.

New Brighton, Pa., July 28, 1906 (H. D. Merrick); East River, Conn., August 4, 1906 (Chas. R. Ely).

NOTES ON SOME AMERICAN COCHLIDIIDÆ, WITH DESCRIPTIONS OF NEW SPECIES.

[Lepidoptera.]

By HARRISON G. DYAR.

Sibine apicalis Dyar.

The series of this species has been increased by 2 males, Cordoba, Mexico, May, 1906 (Wm. Schaus); 4 males, Cordoba, Mexico, August, 1906 (R. Müller); 2 males and 2 females, San José, Costa Rica, October, 1906 (Wm. Schaus); 1 female, La Florida, Costa Rica, March, 1907, and 1 male, Guapiles, Costa Rica, May, 1907 (Wm. Schaus).

This species seems, in series, distinct from the North American *Sibine stimulea* Clemens, being larger, and more spotted, the spots irregular and yellow instead of white.

Sibine sp.

Several specimens of *Sibine* have been sent in by Mr. Schaus which I can not place satisfactorily. The species of *Sibine* must be worked up from the larval side before their specific limits can be determined.

Parasa imitata Druce.

One male, Orizaba, Mexico (R. Müller).

Parasa fauna, n. sp.

Vertex of head and thorax green, face brown, as also lateral margins of patagia and a central line on thorax. Abdomen brown. Fore wing green, a brown patch at base resting on costa, the outer margin narrowly brown with an enlargement below vein 2 and a larger one between veins 4 and 6; a deeper green patch at end of cell. Hind wings and under side brown. Expanse, 37 mm.

One male, Colombia (W. E. Pratt, in collection of Wm. Schaus).

Type.—No. 11544, U. S. National Museum.

Allied to *P. imitata* Druce, but larger and without a brown discal spot.

Parasa wellesca Dyar.

Mr. Schaus has sent in specimens from the following new localities: 3 males, San José, Costa Rica, October, 1906; 1 male, Sixola River, Costa Rica, July, 1907; 1 male, R7.

All the specimens are somewhat larger than the types. No female has yet come to hand. The following table will separate the American species of *Parasa* in which the fore wings have a green band in both sexes:

Fore wing largely green.

Outer brown border broad.

Hind wings yellow, with a brown margin.

Fore wing without discal dot.....*viridiplena* Walker.

Outer brown border narrow.

Hind wings yellow.

Fore wings with a small brown discal dot...*wellesca* Dyar.

Fore wing without a discal dot.....*herbina* Schaus.

Hind wings brown.

Outer brown margin confined to the fringe except at vein 7.

laranda Druce.

Outer brown margin more extensive.

Discal dot large*laonome* Druce.

Discal dot small*imitata* Druce.

Discal dot absent*fauna* Dyar.

Euclea norba Druce.

From Mr. Schaus, 1 male, La Florida, Costa Rica, July; 2 males, Sixola River, Costa Rica, April, 1907; 1 male, Cordoba, Mexico, May, 1906; 1 male, Banana River, Costa Rica, March, 1907. Mr. Busck collected 1 male at Tabernilla, Canal Zone, Panama.

Metraga perplexa Walker.

Two males, Tabernilla, Canal Zone, Panama (Aug. Busck).

Metraga zygia Druce.

Three males, La Florida, Costa Rica, March, 1907 (Wm. Schaus); 1 male, Cacao, Trece Aguas, Alta Vera Paz, Guatemala, April 25 (Barber & Schwarz).

Metraga rubicolor Dyar.

Mr. Schaus has collected 1 male, La Florida, Costa Rica, July; 1 male, Zent, Costa Rica, February, 1907; 3 males, Banana River, Costa Rica, March, 1907.

Metraga emilia, n. sp.

Fore wings reddish brown, the outer and inner margins broadly dark purple; a faint discal dot and outer line, limiting the marginal dark shade; hind wings dark straw-color, the fringe purplish, especially so at anal angle. Head and thorax ferruginous, abdomen ochraceous. Expanse, 18 mm.

One male, Tabernilla, Canal Zone, Panama (Aug. Busck).

Type.—No. 11514, U. S. National Museum.

Allied to *M. rubicolor* Dyar, but the outer margin is shaded as well as the inner and the hind wings are pale. Named in honor of Miss Emily Baker, of Hyattsville, Md.

Natada salta Druce.

Specimens have lately been received from Cordoba, Mexico, three, May, 1906, and one, April, 1906 (Wm. Schaus); four, Sixola River, Costa Rica, April, 1907; one, Chiriquicito, Panama, April, 1907 (Wm. Schaus); one, Merida, Venezuela (S. E. Briceno).

Natada arpi, n. sp.

A rather large species, nearly allied to *N. bergii* Dyar. The color of the fore wing is paler than in *bergii*, shining grayish, the brown shading confined to a patch at origin of vein 2 and a large cloud about lower half of outer line; discal dot rounded, blackish; outer line brown, fainter and curved outward where it traverses the brown cloud. Hind wings dark gray-brown. Thorax and base of abdomen tinged with red. Expanse, 37 mm.

One male, Rio de Janeiro, Brazil (J. Arp).

Type.—No. 11539, U. S. National Museum.

Talima straminea Schaus.

Two males, Sixola River, Costa Rica, April, 1907 (W. Schaus).

Epiperola vafera Druce.

I referred this species to *Paleophobetron* on a specimen from Maroni River, French Guiana, in the Schaus collection. The palpi in this specimen are apparently distorted, as additional examples from Palma Sola, Venezuela, show well-developed palpi, reaching to the middle of the front, thus placing the species in *Epiperola*.

Epiperola vaferella, n. sp.

Shining blackish brown, the fore wings of this color to the outer line, which is narrow, pale, single, slightly curved, reaching from outer sixth of costa to middle of inner margin; space beyond this line more grayish; a pale line at the base of the fringe. Hind wings of the color of the outer space of fore wings, with a pale line at the base of fringe. Expanse, 21 mm.

One male, La Florida, Costa Rica, July, 1907 (W. Schaus).

Type.—No. 11540, U. S. National Museum.

Allied to *P. vafera* Druce, but the outer space is paler, the line single, not doubled, more curved and arising farther from the apex.

Epiperola monochroma, n. sp.

Entirely bright brownish ochraceous without any markings. The wings are rather long and pointed, the head prominent, with large eyes, of the general build of *Perola sericea* Möschler, though smaller. Expanse, 30 mm.

Four males, Bocas del Toro, Panama, April, 1907, and Chiriquito, Panama, April, all collected by Mr. Schaus.

Type.—No. 11541, U. S. National Museum.

Tanadema neutra, n. sp.

Allied to *Tanadema mas* Dyar, but the lines on fore wing broad, distinct, dark gray, the two lines alike, the discal mark forming part of the inner line. The lines are rather sharply angled on the veins, the inner one sharply produced at the lower end of the cell. The ground color of the wings is not so red as in *T. mas*, being of a paler color in two specimens, dark in the other but still without the red cast. Expanse, 19 mm.

Three males, Sixola River, Costa Rica, April, 1907; Tuis, Costa Rica, July, 1907; Banana River, Costa Rica, March, 1907 (Wm. Schaus).

Type.—No. 11542, U. S. National Museum.

Packardia ceanothi, n. sp.

Allied to *P. elegans* Packard, but bright brownish ochraceous instead of bronzy brown. In the dark form (corresponding to *elegans*) the fore wings are brownish ochraceous, crossed by two oblique and one reversed curved pale line, the inner line broadly shaded without with dark fuscous brown, the curved line ending at the anal angle in two superposed dots. Hind wings thickly blackish irrorate. In the pale form (corresponding to variety *fusca* Pack.) the markings are nearly obliterated, being of almost the same shade as the ground color. Hind wings pale straw-color.

Seven specimens, bred from larvæ on *Ceanothus* at Tryon, N. C. The larvæ are similar to those of *P. elegans*, and were so determined in the field. However, Mr. Fiske, who was with me, thought they might be a new species as they seemed so partial to the *Ceanothus*, which is not the case with *elegans*. His supposition proves to be correct.

Type.—No. 11498, U. S. National Museum.

DESCRIPTIONS OF SOME NEW MOTHS FROM SOUTHERN CALIFORNIA.

By HARRISON G. DYAR.

Mr. F. A. Merrick, of New Brighton, Pa., has handed me a number of moths, collected in the vicinity of San Diego, Cal., for identification. The collections were made by Messrs. Geo. H. Field and W. S. Wright. The new species among them are here described wherever there were more than one specimen. A number of uniques have been returned to Mr. Merrick and it is hoped to report on these later when Messrs. Field and Wright shall have been fortunate enough to secure additional specimens.

Family ARCTIIDÆ.

Subfamily LITHOSIINÆ.

Phobolosia reincarnata, n. gen. and sp.

Palpi upturned to the vertex, fringed with long hair in front which projects as much as the length of the head; antennæ serrate in the male, simple in the female; tongue moderately long; eyes large, naked; a tuft of scales projects forward at the top of the vertex; tibæ unarmed, the hind pair with four long spurs; fore wing trigonate, pointed, sub-falcate at the apex, the venation as in *Æolosia* Hampson (Cat. Lep. Phal., II, p. 405, 1900); hind wing rounded trigonate, rather broad.

Fore wing with the ground pale cinereous whitish, but nearly completely overlaid with dark shades; basal space filled in with blackish gray; inner line gray-brown, forming three outward undulations between the costa and median vein, a single large one between median and vein 1 and another smaller one between vein 1 and inner margin; a whitish space of the ground color on each side of this line, the inception of these white spaces on costa forming a pair of oblique dashes; median space filled in with blackish gray, usually heaviest in the middle; discal mark a black bar or crescent followed by a white

spot that touches the outer line; outer line strongly excurved at the end of the cell, undulate, gray-brown, edged with white on each side, the white forming a pair of oblique dashes on the costa, followed by a row of four similar dashes without any continuing lines, the last one being nearly at the subterminal line; subterminal space brownish gray filled; subterminal line whitish, undulate, most strongly produced opposite the cell; terminal space pale gray, not strongly contrasting with the subterminal line; a terminal brown line which expands between the veins and forms above vein 1 and at the apex of the wing a small brown-black speck; fringe brownish, interlined with white at the base. Hind wing white, lightly gray powdered, showing a small, faint, darker discal dot; at the outer margin at the termination of the submedian fold a triangular brown-black speck accompanied by a white dash; a terminal brown line; fringe pale. Body parts whitish gray, irrorate with brown. Expanse, 20-24 mm.

Seven specimens, San Diego, Cal. (G. H. Field), Grapevine, June 29; Grapta Camp, June 29, 1907; Morena, July 4; South Arizona, August 1-15 (O. C. Poling); Kerrville, Tex., June, 1906, and October, 1904 (H. Lacy).

Type.—No. 11696, U. S. National Museum.

I have described this genus in the *Lithosinæ* as it falls there by Sir Geo. Hampson's tables, but it may possibly be found to be better placed in the *Noctuidæ*, subfamily *Erastriniæ*, some species of which have vein 8 of the hind wings anastomosing with the subcostal to nearly the middle of the cell. I am unable, however, to detect ocelli in the present form, whereas they are present in the *Erastriniæ*.

Family LIPARIDÆ.

Animomyia morta, n. gen. and sp.

Form slender, wings thin and rounded; antennæ of the male bipectinate, with very long branches running to the tip; eyes large, front rounded, not prominent; palpi slender, porrect, well exceeding the front, smoothly scaled; tongue obsolete; hind tibiae with two pairs of rather long spurs, the legs moderate; venation as in the accompanying figure (fig. 9); vein 12 anastomosing with 11, 11 and 10, and 10 with the stalk of 7-9; vein 5 arising slightly below the middle of the disco-cellulars; hind wing with vein 5 obsolete, only one internal vein.

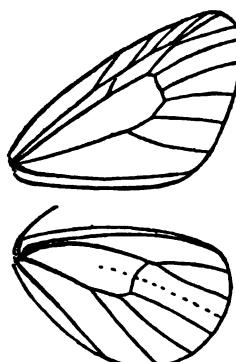


FIG. 9.—*Animomyia morta*: Venation of front and hind wings.

Wings thin and translucent, brownish gray, the fore wing marked with two faint, darker transverse lines, curved, the outer one somewhat irregular in the upper half of its course. The large plumose antennæ are very prominent. Expanse, 18-19 mm.

Four specimens, San Diego, Cal. (G. H. Field), Grapevine, June 29, all males.

Type.—No. 11695, U. S. National Museum.

I am quite in doubt about the proper family reference of this genus. It falls in the Lymantriidæ (Liparidæ) by Sir George Hampson's table if vein 5 of the fore wing be taken as nearer vein 4 than vein 6, which is the case, but only slightly. However, there is no bar between the costal and subcostal veins of hinds wing as called for by the table. The alternative position would be in the Geometridæ, where it would fall in the Ennominae. I can not place it exactly by Hulst's table in default of female specimens, but we have nothing that I know of in the least like it. It looks like the Lithosian genus *Nudaria*.

Family NOCTUIDÆ.

Subfamily AGROTINÆ.

Euxoa fieldii, n. sp.

Head light ocherous gray; collar clay-color in front, with a central curved black line, dark gray behind; thorax dark gray with some ocherous scales centrally; abdomen pale gray. Fore wing with the costa broadly pale, clay-colored in the male except for a red subapical stain, infuscated on the outer half in one female, largely infuscated in the other; basal space below the costa dark gray, separated by black from the costal area, the black forming a triangular spot at base of median vein and also on the costa in the females; inner line forming three curves, blackish, geminate, pale-filled; claviform black-outlined, dark-filled, continued by a black line along submedian fold, which in two of the specimens is bordered on each side by ocherous clay-color; orbicular small in the male, larger and oblique in the females, clay-color with a narrow black edge, the center dark-filled in the females; reniform large, concave on its outer side, clay-color with a narrow black edge and a concentric darker center; cell and below to vein 2 black-filled, the median space below dark gray, a red tint in the male; outer line obsolete, limiting the pale subterminal space, which is broad and forms rays centered by the dark veins, cut by a row of black wedges resting on the pale waved subterminal line; terminal space blackish-filled; a terminal row of minute black cusps. Hind wing whitish in the male with a narrow fuscous border; all fuscous in the females, the fringe whitish. Expanse, 36-38 mm.

One male, two females, San Diego, Cal. (G. H. Field), October 18, November 12 and 14.

Type.—No. 11697, U. S. National Museum.

Nearly allied to *Euxoa lacunosa* Grote, of which it may be a local form. It is, however, much brighter and more contrastingly marked and the costa is distinctly pale as in *wilsonii* Grote; from *wilsonii* the color of the hind wings of the male at once separates it.

Family GEOMETRIDÆ.

Subfamily ENNOMINÆ.

Glaucina epiphysaria, n. sp.

Light gray, faintly washed with whitish over the middle of forewing; lines broken, obsolete; various fragments of the inner line may be seen near costa and inner margin and of the outer line at costa and at end of cell, the small angle at the base of veins 2 and 3 being most persistent; no discal dot; subterminal line a series of pale arcs between the veins edging faint dark elliptical spots; a black line at the base of the fringe. Hind wing whitish over the disk, gray on the margin in the female, the inner margin broadly powdery gray, showing the inception of a transverse dark line, of which various fragments may be distinguished across the wing; fringe pale with a black basal line. Expanse, 21 to 28 mm.

One male, two females, San Diego, Cal. (G. H. Field), October 24 and 29.

Type.—No. 11698, U. S. National Museum.

Allied to *Glaucina erroraria* Dyar, but the fore wings lack the discal dot; the claw on the fore tibæ is much smaller than in *erroraria*, being concealed in the vestiture; the epiphysis of the fore leg is long and slender, exceeding the end of the tibia.

Stenaspidates apapinaria, n. sp.

Apex of fore wing pointed, the outer margin strongly scalloped; hind wing with a distinct prominence at the end of vein 2. Brownish ochreous, the fore wing shaded with red-brown; inner line dark brown, bent beneath the costa, irregular below; discal mark black, with a little light powdering in its center; outer line preceded by a brown shade, blackish, with a narrow outer whitish edge, nearly straight, only slightly inflexed below the cell; an incomplete row of terminal black dots somewhat removed from the margin. Hind wings with a dark discal dot and extra-mesial line, the anal angle broadly irrorated with brown; terminal dots as on fore wing. Expanse, 32 to 37 mm.

Four females, San Diego, Cal., May 27 and June 10, 1907. The collector's name is not attached.

Type.—No. 11699, U. S. National Museum.

Not very close to any of the species with which I am acquainted. Nearest to *zalissaria* Walker, but the inner line is considerably straighter than in that species.

Deilinia indurata, n. sp.

Fore wings not falcate, but the apex rectangular; cinereous, pale, dark or of a reddish tint, uniformly rather sparsely irrorate with dark scales over both wings; a small black discal point on each; inner lines usually obsolete, in some specimens a portion of the inner line shows, dark, not rigid, or a faint median line from the discal dot to inner margin; subterminal line indicated by a series of dark blotches edged without by white scales; a row of black separated terminal dots on both wings. Hind wings with two dark bands more or less indicated, especially towards inner margin. Beneath immaculate, pale, the small discal dots repeated. *Expanse*, 26 to 27 mm.

Eight specimens, all males, San Diego, Cal., May 6, June 12, 27, 28, 1907 (W. S. Wright); Los Angeles Co., Cal. (D. W. Coquillett); middle Cal. (Coll. Dr. W. Barnes); Placer Co., Cal. (A. Koebele); Seattle, Wash. (O. B. Johnson).

Type.—No. 11700, U. S. National Museum.

Differs from *falcataria* Pack. in having the hind wings as much irrorated as the fore wings; distinguished by the peculiar submarginal line.

Selidosema jacumbaria, n. sp.

Male.—Pale lilaceous cinereous, the basal and terminal spaces laved with rosy brown; lines black, distinct, broad, the inner arising on inner margin close to base and running obliquely outward to middle of cell, where it terminates; outer line from middle of inner margin straight to the end of the cell, thence slightly excurved, not quite attaining the costa; a very fine terminal black line, indented on the interspaces. Hind wing similarly colored, except that there is no reddish color at the base; a narrow mesial line on the inner half of the wing, followed by a strong, black, broad line that does not attain the apex. Beneath immaculate silky whitish. *Expanse*, 32 mm.

Female.—Slenderer and narrower-winged than the male. The rosy color is reduced to a band following the outer line, being absent from the base and margin; a subterminal whitish scalloped line, edged faintly with blackish within, which is scarcely legible in the male. Lines narrow, filiform, black, contrasting strongly with the broad smeared lines of the male, the outer line nearly straight.

Three males, one female, San Diego, Cal. (G. H. Field), Thyce Camp, July 1; Grapta Camp, July 1; Jacumba, July 3; July 11, 1907.

Type.—No. 11702, U. S. National Museum.

A large species, the wings bordered with rosy. The male has the hind tibiae enlarged and with a strong groove on the inner side, but there is no hair-pencil in it. In the three males the black lines on the wings vary somewhat in width.

Selidosema æthalodaria, n. sp.

Dark purplish gray, the lines black, oblique; inner line from near middle of costa, angled subcostally, running to inner margin near base; discal dot black; outer line curved above, then straight and oblique, reaching inner margin at about the middle; subterminal line whitish, indistinct, stronger and wavy in the female. Hind wing more grayish, except on inner margin crossed by two faint dark lines, denticulate on the veins and traces of two beyond these at anal angle, these two outer lines continued farther in the female than in the male. Expanse, male 23 mm., female 22 mm.

Four males, two females, San Diego, Cal. (G. H. Field), Bat, June 30; Thyce Camp, July 1; Pine Valley, July 5; Descanso, July 7.

Type.—No. 11701, U. S. National Museum.

A small species resembling *S. wrightioria* Hulst, but without the scalloped subterminal line.

Subfamily GEOMETRINÆ.

Anaplodes delicataria, n. sp.

Palpi and front deep red, a white line between the antennæ, followed by a narrow red line, the nape green. Thorax green. Abdomen green dorsally, white below, the male without red, the female with a few red scales subdorsally, towards the tip. Wings shaped as in *pistacearia* Packard, delicate green, marked with long, fine, white striations; two lines on both wings, slender, not contrasted, slightly flexuous; costa narrowly and the fringe of both wings red, fading to yellow at the base of the fringe. Beneath silky whitish, the green showing faintly. Expanse, 20 to 21 mm. Fore legs red, middle legs with red on the outside, hind legs white. In the male the end of the hind tibia projects beyond the end of the first tarsal joint, the tibia is enlarged, flattened on the upper side, slightly grooved on the inner side, but without hair-pencil. Antennæ white, shortly bipectinate in the male, simple in the female.

Two males, one female, San Diego, Cal., July 23, 29, October 9 (G. H. Field).

Type.—No. 11703, U. S. National Museum.

Family PYRALIDÆ.

Subfamily CHRYSAUGINÆ.

Xantippe descansalis, n. sp.

Head, thorax, and fore wings lustrous warm red-brown, dark and uniform, crossed by two very faint pale lines; the lines are so faint that their position even is uncertain; the inner is near the base, the outer at the outer third, both nearly straight. Hind wings subpellucid dark fuscous; abdomen dark fuscous. *Expanse*, 15 to 17 mm.

Three specimens, San Diego, Cal. (G. H. Field), Morena, July 4; Descanso, July 7.

Type.—No. 11694, U. S. National Museum.

Subfamily PYRAUSTINÆ.

Glaphyria periculosalis, n. sp.

Fore wing pale stramineous, powdered and shaded with brown, most distinctly over cell between inner line and discal mark and in terminal area; lines brown, slender; basal line continuous, angled in the middle; inner line angled on subcostal and in cell, thence evenly outcurved and oblique to inner margin; outer line arcuate, minutely dentate, angled inward at vein 2, outcurved below to inner margin; discal mark two opposed brown cusps followed by a white mark produced on its lower angle to outer line; outer margin excavate below the apex, the fringe white, marked with brown at apex and middle of outer margin. Hind wing with an outer curved brown line, the terminal space shaded with brown; a brown line before base of fringe on both wings. *Expanse*, 15 to 18 mm.

Five specimens, San Diego, Cal., June 26, July 7 and 30 (G. H. Field); July 27 and August 8, 1907 (W. S. Wright).

Type.—No. 11693, U. S. National Museum.

This species does not belong in *Homophysa* Guen. (= *Glaphyria* Hübner acc. Fernald on Sir Geo. Hampson's definition [Proc. Zool. Soc. Lond., 1898, p. 607]), as veins 10 and 11 of fore wings are separate and I can not distinguish pecten on the median vein of hind wings, but neither are they in *reniculalis* Zeller, which is included. The species would fall in *Sympysa* except that the maxillary palpi are too short. They reach only to the end of the second joint of the labial palpi. According to the table it falls in *Zinckenia* (*Hymenia* Hüb. of our lists), but I do not like this association.

Metasia morenalis, n. sp.

Fore wing rather narrow, dark reddish brown, slightly bronzy; lines very faint, pale, the inner obliterate, angled in the cell, oblique below;

discal marks darker, very obscure, the reniform lunate; outer line slightly excurved on the median venules, denticulate. Hind wing pale, subpellucid, slightly infuscated, distinctly so on the outer margin; a curved dark punctiform line, close to margin from anal angle to middle of wing, then becoming remote. Expanse, 20 to 22 mm.

Four specimens, San Diego, Cal. (G. H. Field), Grapevine, June 29 and July 1; Morena, July 4.

Type.—No. 11692, U. S. National Museum.

Subfamily PHYCITINÆ.

Ambesa mirabella, n. sp.

Head and thorax dark gray, frosted with white scales; abdomen pale ocher. Fore wing dark gray, strongly frosted with white on the costal half; inner line black, broken in the cell, the two broken ends produced along the cell to its end, the lower half of the line distinctly narrowly edged with white; veins at base and above the cell marked with black lines; outer line gently excurved mesially, black, subdenteate, edged without with white; a black line at base of fringe. Hind wing pale semitransparent ocher. Expanse, 20 to 26 mm.

One male, two females, San Diego, Cal. (G. H. Field); two, Thyce Camp, July 1; one, Jacumba, July 3.

Type.—No. 11688, U. S. National Museum.

Allied to *A. lallatalis* Hulst, but the outer line is not broken and the hind wings are yellow. Moreover *lallatalis* is not an *Ambesa* as the male antennæ have a tuft of scales in the bend, not a row of teeth.

Salebria ochripunctella, n. sp.

Head and thorax shining gray, shaded with brownish ocherous. Fore wing long and narrow, dark gray, nearly obscuring the markings; inner line broad, white, clouded, marked with dull ocher; discal dot a round ocherous point, edged below with a black quadrant; outer line pale, obscure, mesially excurved, edged by a dark shading which is most pronounced apically; a terminal row of dark dots. Hind wing whitish, subpellucid, shaded with fuscous on the costal edge; a double dark line at the base of the fringe. Expanse, 20 to 23 mm.

Two males, one female, San Diego, Cal. (G. H. Field), October 12 and 20.

Type.—No. 11689, U. S. National Museum.

Not similar to any species at present referred to the genus that is known to me.

Sarata umbrella, n. sp.

Head and thorax ocherous; abdomen pale gray, sprinkled with black atoms, the apices of the segments ocherous. Wing moderately broad,

the outer margin perpendicular; ocherous, shaded with dark brown especially at base and along costa; lines white, moderately slender, the inner oblique from costa to median vein, thence perpendicular to inner margin near middle; outer line slightly excurred mesially, not dentate; a triangular blackish-brown shading between veins 2, 5, and outer line, another at costa above vein 6, and a dot on vein 1 at the inner line; a blackish line before the fringe. Hind wing subpellucid, pale fuscous, the fringe pale. Expanse, male 22 mm., female 22-30 mm.

Two males, two females, San Diego, Cal. (W. S. Wright), August 2, 11, September 2, 1907.

Type.—No. 11690, U. S. National Museum.

Allied to *S. rhoiella* Dyar, from Colorado, but differing in color and markings.

Subfamily ANERASTIINÆ.

Valdivia mirabilicornella, n. sp.

Antennæ of the male bipectinate to the outer fourth, the outer series of branches very long, the inner series very short. Pale whitish cinereous, sprinkled with darker scales; fore wing with the inner line obscure, dentate, pale, followed by a dark line and preceded by a large band which is ocherous orange next the line and smoky black toward the base of the wing; discal dots black, reversed oblique, converging outwardly, the upper one faint and sometimes obsolete; outer line pale, defined by a black shade; a row of black terminal dashes nearly forming a line. Hind wing subpellucid whitish, shaded with fuscous along costa and outer margin; fringe pale. Expanse, 24 mm.

One male and four females, San Diego, Cal. (G. H. Field), October 12, 14, 25, and 31.

Type.—No. 11691, U. S. National Museum.

Allied to *V. (Maricopa) lativittella* Ragonot from Mexico and Arizona, but larger, less distinctly marked, and the antennæ of the male pectinated.

Family PTEROPHORIDÆ.

Agdistis adactyla Hübner.

Two specimens were taken south of San Diego near the sea. The species seems the same as the European one, although this is the first record of the genus in America. June 2, 1906 (Dyar & Caudell).

—Dr. Howard spoke briefly upon certain new observations on parasites now being made by Mr. W. F. Fiske, at the Massa-

chusetts Laboratory for the introduction and acclimatization of the European parasites of the gipsy moth and the brown-tail moth.

—Mr. Barber exhibited specimens of the larvæ, pupæ, adults, and work of a ptinid beetle, *Dorcatoma dresdensis* Herbst, which he reared from fungi, principally *Elvingia fomentaria*, collected in Wisconsin. The other species of *Dorcatoma* are supposed to breed in rotten wood. He also exhibited a braconid parasite of the *Dorcatoma* and some photographs of the various stages of the work. Mr. Schwarz said that now was the time to do some fine work rearing fungus insects. Early entomologists could not get fungi named, so many valuable records were lost. Now, with so many mycologists in the field, it should be an easy matter. Most of the insects will probably be found to infest but a single host.

—Mr. Schwarz exhibited a specimen of the cerambycid beetle, *Adetus subellipticus* Bates, which was reared by Mr. Barber and himself from an apparently cucurbitaceous vine at Panzos, Guatemala. This vine appeared to be in perfect health when collected, and apparently was not injured by the insect. He mentioned another instance where a cerambycid develops in a green soft vine without apparently doing any harm, Mr. D. L. Van Dine, of Honolulu, having sent in to the Bureau of Entomology for determination numerous specimens of an allied cerambycid, *Apomecyna pertigera* Thompson, the larva of which infests the growing vines of watermelons in the Hawaiian Islands. In both cases the vines showed no outward sign of infestation. At Honolulu the melons ripened on the infested vines without showing any deterioration.

—The secretary read the following note, secured through Mr. Busck:

MOSQUITOES DESTROYED BY THE NIGHTHAWK.

By ALLAN H. JENNINGS, *Ancon, Canal Zone, Panama.*

In May, 1887, while collecting on the island of New Providence, Bahamas, I had an opportunity of observing the mosquito-eating habit of the Cuban nighthawk.

One afternoon about 4 o'clock a heavy thunderstorm came up from the west accompanied by much rain. When the storm passed by, about an hour before sunset, it was followed by large numbers of birds of many species, but mainly the smaller insectivorous birds, warblers, etc. They were moving in the direction the storm had taken and were evidently feeding as they went, though passing quite rapidly. Accompanying them was a number of Cuban nighthawks flying rather low at about the level of the tops of the somewhat low trees fringing the coast at this point, or, in other words, at a height of 25 or 30 feet.

Two of these were taken and on preparing the skins were found to be exceedingly fat while the stomachs were distended with mosquitoes, apparently a small species of *Culex* and resembling the species that was most abundant in the locality.

The stomachs of a few warblers taken at the time were also full of mosquitoes. Unfortunately I made no note of stomach contents of other specimens of the species taken at other times and points in the island.

—Mr. Schwarz exhibited a photograph of the tubes of a common blue mud dauber from Plummers Island, Maryland, probably *Chalybion ceruleum* L. He said that there were various facts in the life history of the insect which were unknown to him; for instance, how many tubes are built by a single female; how the hissing noise made by the female while constructing cells is caused; whether the tachina fly, *Pachyophthalmus signatus* Meig., which is reared from the tubes is parasitic upon the wasp, on the spiders, or on the insects that form its food, and how the fly emerges from the hard clay tube.

Mr. Schwarz gave an interesting account of an observation made by various members of the Washington Biologists' Field Club last summer, of the manner in which one tachina fly tried to enter one of the mud dauber tubes and how the parent wasp defended its home against the intruder.

Doctor Howard said that all of the European records giving parasites of the mud daubers were wrong. In every case the parasite was upon the insects carried in as food instead of upon the wasp itself.

Mr. Kraus said that he had marked one female wasp (*Trypxylon albifrons* Fab.) with whiting and that she built five tubes side by side. Mr. Schwarz said that in the case he observed, two tubes were built by two wasps working together.

—The following papers were presented for publication:

ON TWO NEW SPECIES OF PARASITES OF ALEYRODIDÆ.

By L. O. HOWARD.

In the course of the extensive investigations of the white fly (*Aleyrodes citri* R. & H.) now going on in Florida under the auspices of the Bureau of Entomology, as described by Mr. Marlatt at a recent meeting of the Society,^a much attention is being paid to parasites. *A. citri* is as yet unparasitized, but other Aleyrodidæ are frequently killed in great numbers by several species of parasites of different genera. An effort is being made to induce the parasites of other species to attack *A. citri*, and as many species as possible are being introduced into Florida with this end in view. As yet none of them has attacked *A. citri*. A recent series of slides received from Dr. A. W. Morrill contain, among others, two new species which are here described.

Subfamily APHELININÆ Howard.

Genus ENCARSIA Foerster.

Encarsia Foerster, Kleine Monographien, 1878, pp. 65–66. (Type, *Encarsia tricolor* Foerster).

Including the single species here described, 14 species of this genus have been recognized, of which one was described by Foerster, one by Zehntner, and the remainder by the writer. Like other parasites of Coccidæ and Aleyrodidæ, the genus is now of wide distribution and if it were ever once localized it is now too late to approximate its original range. It is now represented in Europe, North America, Java, South Africa, West Indies, and Mexico.

Twelve of the 14 species have been reared, and of these 12, 3 have come from diaspine scale-insects and the remaining 9 from Aleyrodidæ. From the rearings so far made, the species

^a See Proc. Ent. Soc. Wash., IX, pp. 121–124, 1908.

of this genus seem to be the most numerous and important of the parasites of Aleyrodidae.

Encarsia variegata, n. sp.

Female.—Length, 0.64 mm.; expanse, 1.52 mm.; greatest width of fore wing 0.28 mm. Eyes faintly hairy; head broad, eyes well separated; ocelli large, situated at angles of a right-angled triangle; antennæ nearly naked; first funicle joint slightly shorter than pedicel, which is slightly swollen; second funicle joint longest, joints 3 and 4 and first joint of club subequal in length and each shorter than second funicle joint; terminal joint of club slightly shorter than basal joint. All tarsi 5-jointed. Ovipositor well extruded. Color: Head and thorax brown, except the mesoscutellum which is almost entirely silvery white; antennal scape and all legs pallid and nearly translucent; flagellum of antennæ yellowish; eyes dark red; ocelli red, not so dark as eyes; abdomen yellow, brighter above, but bordered on both sides and behind with a brown band. Wings perfectly hyaline, with a densely ciliate disc.

Type.—No. 11707, U. S. National Museum. Described from 2 female specimens reared by Dr. A. W. Morrill at Orlando, Fla., June 25, 1907, from *Aleurodicus perseæ* on lemon leaves. It produces a curious dimorphism in its hosts, according to Doctor Morrill's notes. Slide mounts sent by Doctor Morrill to Washington show that a single pupa of the parasite almost entirely fills the body of the host.

Genus ERETMOCERUS Haldeman.

Eretmocerus Hald., Amer. Journ. Science, Vol. IX, pp. 110, 111, May, 1850.

Doctor Haldeman, in the article just cited, describes among other things *Aleyrodes abutilonea* and *A. corni* and erects the new genus *Amitus* to contain *A. aleurodinis*, a parasite of the larvæ of *Aleyrodes corni* "of which it destroys a great many." His new genus *Eretmocerus*, to contain *E. corni*, n. sp., was based upon two mutilated females reared with this *Amitus*. He suggested that the *Eretmocerus* may possibly be parasitic in the body of the *Amitus*, making it a hyperparasite. Neither genus nor species was refound until 1895, when the writer described *Eretmocerus californicus* (Tech. Ser. 1, U. S. Dept. Agric., Div. Ent., Revision of the Aphelininæ of N. A., pp. 16, 17, figs. 1 and 3) from both sexes. This description was drawn up from many male and female specimens reared in June and October from an *Aleyrodes* on *Quercus agrifolia* at Los Angeles, Cal. by D. W. Coquillett. Mr. Coquillett apparently reared nothing else from the *Aleyrodes* on this par-

ticular food plant, but he reared *Pteroptrix flavimeda* How., *Encarsia angelica* How., and *E. coquillettii* How. from *Aleyrodes* on different plants at about the same time and in the same general locality, and there is nothing in his record to negative the idea that *E. californicus* may be hyperparasitic.

***Eretmocerus haldemani*, n. sp. (fig. 10).**

Female.—Length, 0.64 mm.; expanse, 1.78 mm.; greatest width of fore wing, 0.32 mm. Antennal club more than four times as long as pedicel, not ellipsoidal as with *E. californicus*, but approaching the oar-shape figured by Haldeman for *E. corni* and lacking the longitudinal lines found abundantly on the club with *E. californicus*; antennæ as a whole about as long as entire body. Mesoscutum and mesoscutellum with a wide delicate irregular subhexagonal sculpture, the scutum in addition being faintly granular. (In *E. californicus* the surface of these sclerites is faintly aciculate.) General color lemon-yellow, eyes reddish, ocelli crimson, legs pallid, flagellum of antenna yellowish.

Male.—Resembles female except for usual sexual differences.

Type.—No. 11708, U. S. National Museum. Described from 1 male and 1 female reared by A. W. Morrill at Orlando, Fla., from *Aleyrodes coronata* received from E. M. Ehrhorn, Berkeley, Cal. From the same material were reared several specimens of *Prospalta aurantii* How. and of a proctotrypid which the writer determines with some hesitation as *Amitus aleurodinis* Hald. So that here we have a situation almost precisely similar to that described by Haldeman fifty-eight years ago, and this species may very well prove to be a parasite of the *Amitus*.

On looking over some old material a slide was found carrying several specimens of the male of what is apparently this species, bred Aug. 27, 1895, from an *Aleyrodes* on cotton from Harrisville, Miss., together with a female of *Encarsia coquillettii* How.

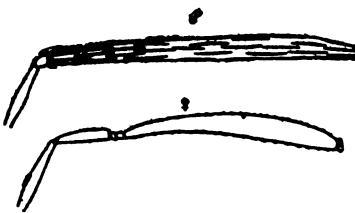


FIG. 10.—*Eretmocerus haldemani*: Antenna of male above, of female below.

A DECEPTIVE BEE.

By T. D. A. COCKERELL.

The time may come some day when our bee-fauna will be so well known that the student can safely determine species by their superficial appearance. At present, however, the subject is full of pitfalls, owing to the fact that specimens apparently referable to well-known forms frequently prove upon minute examination to be quite distinct, and undescribed. Thus the determination of any collection takes much time and care, even though it may consist exclusively of well-known species. Just now, I have before me a bee received from Mr. Nathan Banks with the label "*Nomada modesta?*" As I glanced at it, I thought it strange that so familiar and common a species should be identified with a query; but upon closer examination I at once saw that it was not typical *modesta*, and after minute comparisons felt able to demonstrate that it belonged to an entirely distinct species. I describe it as follows:

***Nomada mimula*, n. sp.**

Length about 10 mm.; black with yellow markings; legs red and yellow, more or less stained with blackish; abdomen finely and closely but conspicuously punctured; b. n. going some distance basad of t. m.; second s. m. very large, receiving first s. n. beyond the middle; scutellum strongly bigibbous. In size, color, and markings exactly like *N. modesta*, except as follows:

Clypeus and labrum yellow; yellow lateral face-marks only going a short distance above level of antennæ; scape stouter, yellow in front; *third antennal joint conspicuously shorter than fourth*, being about as long as fifth; a yellow spot at exact summit of eye (behind it in *modesta*); punctures of mesothorax, though strong, much finer and more even; lateral corners of mesothorax (just in front of tegulae) yellow; metathorax black without yellow spots, but with a conspicuous patch of white hair on each side; tegulae larger, ferruginous marked with yellow, strongly punctured; basal nervure as described above; *anterior coxa with only a rudiment of a spine*; anterior and middle tibiae with much yellow at both ends; hind femora much suffused with blackish, especially behind, and with a yellow spot at apex in front; hind tibiae with more yellow than the others, the outer margin continuously yellow; first abdominal segment more punctured laterally, the band narrowly interrupted in the middle, and incised behind on each side; fifth segment yellow, with a rounded black mark on each side, and a little basal one in the middle, the silvery lunule not on a dark patch; venter dark reddish, with yellow markings on segments 3 to 5.

Falls Church, Va. (Nathan Banks). According to Robertson's arrangement this will not even fall in the same genus with *N. modesta*; it belongs rather to his genus *Xanthidium*, but rests uncomfortably there. I think there must be real affinity with *modesta*; if not, and the case is simply one of convergence, it is truly remarkable.

Two other bees collected by Mr. Banks show striking peculiarities, which seem not to be of specific value:

(1) *Colletes americanus* Cress., female, Great Falls, Va., September 11. Hair of thorax above bright orange ferruginous, like that of *C. thoracicus* and *C. aztecus*. I cannot separate the female from *americanus*; it is just possible that a male might show differences.

(2) *Colletes nudus* Rob. Falls Church, Va., June 23, both sexes at flowers of *Ceanothus*. One male, not otherwise differing, has the first recurrent nervure entering the second submarginal cell at the basal corner, quite the same on both sides. It seems to be the transversocubital nervure that has shifted.

At Falls Church, September 4, Mr. Banks took the female of *Epeolus vernonae* Ckll., not hitherto described. It is conspicuously larger than that sex of *E. pusillus*, and has the scutellum red.

Mr. Banks has taken a number of interesting species of *Nomada* at Falls Church, including *N. carolinæ* Ckll. (female April 25), *N. undulaticornis* Ckll. (male April 18, at pussy willow), *N. placida* Cress. (Sept. 7), *N. perplexa* Cress. (June, at *Ceanothus*), *N. ovata* Rob., etc.

APRIL 2, 1908.

The 221st regular meeting was held at the Saengerbund Hall, 314 C street, N. W. In the absence of the President, First Vice-President Heidemann presided. Messrs. Barber, Burgess, Burke, Busck, Ely, Heidemann, Howard, Jones, Kraus, Marlatt, Marsh, Patten, Popenoe, Sanders, Sasscer, Schwarz, Webb, and Webster, members, and Messrs. H. L. Frost and C. B. Hardenberg, visitors, were present.

The following paper was read by Doctor Howard:

A NEW GENUS AND SPECIES OF MYMARIDÆ.

[Hymenoptera, Chalcidoidea.]

By L. O. HOWARD.

The very minute and structurally interesting insects of the family Mymaridæ have attracted considerable attention, and several well-known entomologists have written about their curious structure and habits. Haliday, Westwood, Förster, and Nees ab Esenbeck have in their turn interested themselves to a considerable extent in these most curious creatures; Ashmead and the writer have described a few American forms, and Mr. A. A. Girault is about to monograph the species found in this country. So far as known, all of the species are parasitic in the eggs of other insects, and as a consequence they are extremely minute in size—in fact the family has been stated by some writers to contain the most minute of all insects.

Among a number of interesting parasitic Hymenoptera reared by Dr. A. W. Morrill in the course of his investigations, for the Bureau of Entomology of the U. S. Department of Agriculture, on the white fly of the orange (*Aleyrodes citri* R. & H.) at Orlando, Fla., and which Doctor Morrill has sent to the writer for study, there occurs a very striking mymarid, notable for its large size, which seems with little doubt to belong to a genus hitherto uncharacterized.

Family MYMARIDÆ Ashmead.**Subfamily MYMARINÆ Howard.****Genus COSMOCOMOIDEA, n. gen.**

Female.—General form rather slender. Head well rounded; eyes smooth, prominent, well separated; ocelli large, situated at angles of a slightly obtuse-angled triangle, the lateral ocelli farther apart from each other than from the eye margin; face with a very distinct transverse carina above, with oblique carinæ arising near each extremity and extending towards mouth. Antennæ (fig. 11) inserted on middle of face, bases widely separated, touching eye margin; 11-jointed; scape short, slightly rounded out below; pedicel short, obconical, a little longer than wide; first funicle joint a little longer than pedicel but much shorter than second, third, and fourth joints which decrease gradually in length from 2 to 4; joints 5 to 8 also decrease gradually in length; club obliquely truncate and somewhat longer than the three

preceding funicle joints together. Pronotum prominent, well rounded, posterior margin incised in the middle. Mesoscutum with well-marked parapsidal furrows somewhat divergent anteriorly. Metanotum with shallow median longitudinal sulcus. Abdomen petiolate, petiole nearly as long as hind coxa; remainder of abdomen shorter than thorax,



FIG. 11.—*Cosmocomoidea morrilli*: Antenna of female.

narrow ovate. Forewings slender but well-rounded; submarginal vein extending for a little more than a third of the wing length and ending in a rounded knob; hind wings excessively narrow.

Male.—Antennæ 11-jointed, all joints appearing flattened, subequal in length, terminal joint shortest; all joints well separated and longer than broad; scape short, only slightly longer than pedicel, rounded on anterior border; pedicel with rounded margins.

The genus resembles in many respects *Polynema* Hal. (= *Cosmocoma* Först.), but differs in the 11-jointed antennæ of the female and in other respects. It derives its name, however, from the general resemblance.

COSMOCOMOIDEA MORRILLI, n. sp.

Female.—Length, 1.4 mm. Expanse, 3.9 mm. Greatest width of fore wings, 0.4 mm. Greatest width of hind wings, 0.06 mm.

General surface of body smooth, shining; mesoscutellum faintly aciculate-punctate; general color very light brown, almost light yellowish clay color; eyes black; ocelli reddish; a transverse black band across the hinder portion of the mesoscutum; metascutum dusky; abdomen with two transverse dusky bands at base and near middle. Pronotum edged with brownish; antennæ black, except 5th and 6th segments of funicle which are silvery white, and the scape and pedicel which are honey-yellow. Tarsi and tibiæ dark, the remainder of the legs concolorous with body; wings hyaline except for faint dusky patch beyond stigma. These colors are darker in some individuals.

Male.—Measurements about the same. Antennæ black. Body entirely black, shining. All femora and coxæ black; tibiæ and tarsi brownish. Wings perfectly hyaline.

Type.—No. 11856, U. S. National Museum. Described from 1 male and 6 female specimens reared by Dr. A. W. Morrill at Orlando, Fla., March 29, 1907, from the eggs of what is apparently a homopterous insect. According to Doctor Morrill's notes, the eggs of the host insect seem to be de-

posited just below the epidermis of the leaf of orange in a parallel series and dusted over with a whitish powder. These eggs are quite frequently found in citrus leaves and in the leaves of *Magnolia fuscata*.

—Mr. Schwarz exhibited a series of the species of the Scarabæid genus *Dynastes*, and pointed out the specific differences. He said that *Dynastes neptunus* should be generically separated from the rest of the species, as was done many years ago by Burmeister, who erected the genus *Theogenes* for this species. He said also that the large species from Central America should not be quoted as *Dynastes hercules* L. All of the specimens in the U. S. National Museum collections from Honduras belong to *D. perseus* Oliv., which is probably specifically different from *D. hercules*. The National Museum collections contain also specimens of *D. alcides* Fab., from British Honduras, which may be only a form of *D. perseus*. The species lately described by Mr. A. H. Verrill from the Island of Dominica as *Dynastes vulcan* is not in the National Museum collection. From the description and figure it appears to be closely allied to *Dynastes alcides*. A number of fine photographs of the various species, made by Mr. H. S. Barber, was exhibited (see Plates I, II).*

—In connection with Mr. Schwarz's remarks on *Dynastes*, Mr. Barber exhibited the described species of the allied genus *Megasoma* Kirby, and pointed out a specimen from Arizona which no doubt represents a new species close to *M. thersites* Lec. A single dead and mutilated specimen of this new species was found by Hubbard and Schwarz on the road between Tucson and Nogales.

—Mr. Webster stated that on April 1, 1890, a number of insects were taken from a crow's nest, among them a considerable number of lepidopterous larvæ of different sizes. These were sent to the Bureau of Entomology on May 3 and

* EXPLANATION OF PLATES I AND II.—Fig. 1, *Dynastes (Theogenes) neptunus*; fig. 2, *Dynastes hercules*; fig. 3, *D. perseus*; fig. 4, *D. alcides*; fig. 5, *D. vulcan* Verrill; fig. 6, *D. hyllus*; fig. 7, *D. granti*; fig. 8, *D. tityus*. Two-thirds natural size.

were determined, May 5, as probably those of a pyralid, having very much the appearance of the larvæ of *Asopia*. Besides these larvæ there was a number of specimens of a beetle, *Tenebrio molitor* L., and also a number of cockroaches. These were all found alive and among decaying leaves in the bottom of the nest just beneath the lining. The crow's nest was in a tree, about 30 feet from the ground, and contained at the time six eggs, showing that it was occupied. While the *Tenebrio* and the cockroaches might have been attracted to the nest, possibly by a broken egg, it is somewhat difficult to account for the presence of the larvæ.

Mr. Busck stated that tineid larvæ are often found in nests, where they probably feed on the excrement. Pyralids might have the same habit. Mr. Barber said there was quite a fauna which was peculiar to bird's nests. He collected thirty or forty species of beetles from one buzzard's nest. Some of them he had found nowhere else. Mr. Schwarz said that a number of Coleoptera were peculiar to birds' nests.

—Dr. Howard exhibited an interesting postcard which he received from Prof. Antonio Berlese, of Florence, Italy. The picture on the card, evidently a photograph of a microscope slide, shows a nearly full-developed specimen of the chalcidid parasite *Prospalta berlesei* How., which is about ready to emerge from its host, *Diaspis pentagona* Targ. (Coccidae). Doctor Howard said that the photograph was very interesting, because it indicated that this American parasite is becoming established in Italy, where it was first reared by Professor Berlese from material sent from America. At that time Professor Berlese recognized it as a new species, and returned it to Doctor Howard, who described it.

Mr. Sanders said that another interesting point is, that while the scale is not at all injurious to mulberry in this country, it is so destructive to the mulberry in Italy that it threatens the silk industry.

—Mr. Schwarz stated that last fall members of the Washington Biologists' Field Club made a practical test of Professor Berlese's sifting machine, a description of which has been

published by Doctor Howard.* At this trial, the machine did not work satisfactorily. Only a few insects were trapped. The most serious drawback is that a larger or smaller quantity of fine dust goes along with each specimen that falls through the funnel. This makes it much more difficult to pick out the specimens than it would be to collect them in the first place by the old-fashioned way.

—Mr. H. L. Frost, of the Cambridge Entomological Society, was invited to speak, and referred to what he considered an interesting change of habit in the gipsy moth (*Porthezia dispar* L.), discovered in the course of the campaign against that pest. During the earlier years that the species was observed, most of the larvæ were on the lower limbs of the trees and often crawled down the trunk, where they could be taken by banding. Now most of them keep in the upper branches and do not come to the bands. This makes the species more difficult to combat.

Doctor Howard said that in his opinion this was not a change in habit, but a case of the survival of the fittest. The individuals that had the habit of living on the lower limbs and crawling to the bands were exterminated, while those that remained in the tops were left to increase and perpetuate the race. Mr. Schwarz disagreed with this. He thought that it might be a true change in habit, caused by the difference of the summer climate in America. The much greater heat may cause the larvæ to seek the upper branches, where it is cooler.

Quite a discussion on the change of habit in insects followed. Mr. Marlatt said he believed that certain races of a species would acquire new food habits, or in other words that special food-plant races of a species often develop. As examples of this, he cited the following cases: The scale-insect *Diaspis pentagona* Targ. has developed an American race that is indifferent to the mulberry, which is severely injured by that species in Asia and Italy. *Aspidiotus diffinis* Newst. developed a race on the U. S. Department of Agriculture grounds which confined itself to a single variety of lilac, not even extending to other varieties in close proximity. This habit was main-

* *Entomological News*, xvii, No. 2, pp. 49-53, February, 1906.

tained for eight or ten years, until the host plant was destroyed. These examples and others show that fairly fixed food races are developed.

Mr. Webster agreed with Mr. Marlatt, and mentioned the northern corn root-worm (*Diabrotica longicornis* Say) as another illustration of an insect changing its food habits. There is no doubt whatever that this species long ago inhabited the country between Kansas and Nebraska and the Atlantic Coast, but back in the seventies the beetle was by no means common in many parts of Illinois and eastward. Mr. Webster remembered perfectly the first specimen he ever found, about 1875, in northern Illinois. It was afterwards found near Buffalo, N. Y., on willows, by Reinecke, and in Nova Scotia by Harrington. Up to about 1860 Illinois and Iowa were essentially wheat-growing States and corn was a minor crop. Soon after that, conditions began to change, the wheat fields were diverted to corn, and this crop was grown year after year successively on the same land. It must have been some time between 1870 and 1880 that the species began to infest the corn fields, and the first records we have of its destructive work on corn came from the great corn-growing regions of Illinois and eastern Iowa. Very soon afterwards the insect began to swarm in the corn fields and the crop in some localities was badly damaged and even wholly destroyed. Now this corn-feeding race, if it may be so termed, began to diffuse itself to the eastward. By 1885 it had become a serious enemy to corn in western Indiana and by 1892 it had reached western Ohio; by 1895 it had extended its ravages nearly half way across the State. Its progress during these years in Ohio was illustrated by maps in Bulletin 68 of the Ohio Agricultural Experiment Station. In contrast with this condition in the western part of the State, it may be stated that it was impossible to find it far in advance of its destruction either as to locality or date. At Wooster, in the northeastern-central part of the State, Mr. Webster was unable to find it at all until 1902, when a single beetle was found upon the blossom of a garden sunflower. Now, its occurrence sparingly over this whole country long prior to these days is beyond question, and not until this corn-

feeding race originated in the immense corn fields of Illinois and eastern Iowa did this gradual tidal wave sweep over and reoccupy the eastern country, and it seems doubtful if, but for this change of habit, we should ever have witnessed this phenomenon. At present, the corn fields of northern Kansas and southeastern Nebraska seem to be literally overrun with this insect. During August and September it may be found in myriads on the blossoms of a species of *Helianthus* that grows abundantly in that section and also on goldenrod, and it does not seem possible that it there has this corn-feeding habit, else it would be impossible for farmers to grow this cereal.

Mr. Webster said that a good illustration of the partial or entire immunity of forest trees growing naturally in the woods to the attacks of some insects that affect the same species of tree when planted on lawns or along roadsides, is offered by the walnut caterpillar, *Datana integerrima* G. & R. Year after year this will defoliate walnut trees growing on lawns and along streets and roadsides, but he did not remember of ever having observed an infested tree growing up naturally in the woods.

—The following papers have been presented for publication:

NEW BICOLORED CIOIDÆ.

[*Coleoptera.*]

(PLATE III.)

By E. J. KRAUS.

Among the insects found in lichens and decaying wood and sometimes confused in collections with the true bark and wood-boring Scolytidæ are a number of species of *Cis* and other Cioidæ. Certain beautifully colored species occurring in the United States and Cuba have heretofore been undescribed, and at the suggestion of Mr. E. A. Schwarz and Dr. A. D. Hopkins, the writer has prepared the appended descriptions, based on material in the U. S. National Museum, and that collected at Virginia Beach, Va., by Doctor Hopkins.

In his descriptions of new species belonging to this family, Colonel Casey^a gives especial attention to the clypeus and clypeal margin as furnishing good taxonomic characters. The structure referred to by him appears not to be the clypeus, however, but to be made up of the epistoma as recognized by Dietz,^b Hopkins^c, and others, together with the produced angles of the front. The latter consist in an elevated ridge on the anterior margin of the front, extending between the epistoma and the eye on either side. The true clypeus is very small, membranous or feebly chitinized, and more or less rudimentary.

The epistoma presents excellent taxonomic characters to be recognized in the variations in its general shape and size, form, and extension of the margins, its elevation or depression, punctuation, surface characters, and further secondary sexual modifications. In the frontal angles we may recognize equally valuable characters.

The term *glabrous*, as used below, signifies the absence of distinct pubescence or setæ; under high power each puncture can be seen to bear a very small hair, invisible, or nearly so, with an ordinary lens.

Genus CIS Latreille.

Antennæ 10-jointed, third segment longer than fourth, the club 3-jointed; prosternum well developed before the coxae and without distinct, prominent, median carina; lateral edges of prothorax acute to apex; body varying in form, setose or pubescent, the vestiture erect and bristling; anterior tibiae finely produced and dentiform externally at apex, sometimes simple; head and prothorax strongly modified in the males of some species, the epistoma and frontal angles more frequently the only parts affected. There is also present in the males of some species a deep circular fovea at the center of the first ventral segment of abdomen.

Cis superbus, n. sp. (Plate III, fig. 1).

Female.—Elongate, setose, straw-yellow; prothorax marked with a distinct piceous triangle, its apex acutely prolonged posteriorly slightly beyond the middle; elytra marked at base with a broad, piceous, triangular spot posterior to which is a broad M-shaped band of yellow followed posteriorly by a similar piceous band, the central portion of

^a Casey, T. L.—Studies in the Ptinidae, Cioidæ, and Sphindidae of America. Journ. N. Y. Ent. Soc., Vol. vii, 1898, pp. 76-91.

^b Dietz, W. G.—Notes on the species of *Dendroctonus* of Boreal America. Trans. Am. Ent. Soc., Vol. xvii, 1890, pp. 27-32, figs. 1-6.

^c Hopkins, A. D.—Notes on scolytid larvæ and their mouth parts. Proc. Ent. Soc. Wash., Vol. vii, 1906, pp. 143-149, fig. 5.

which is prolonged as a narrow line either side the suture to the apex, the remainder yellow. Abdomen fuscous; legs amber. Head brownish yellow; front subconvex, punctures numerous, circular, each bearing a short bristle; epistoma opaque, not punctured, slightly elevated, subquadrate, lateral margins diverging anteriorly, anterior margin broadly rounded, blending with the frontal angles to form a strongly curved ridge extending between the eyes. Prothorax nearly as long as wide, the sides broadly curved, anterior margin rounded, narrowed and somewhat produced over the head, base broadly rounded posteriorly, punctures very numerous, small, dense, each with a stiff bristle. Elytra twice as long as prothorax, not quite twice as long as wide at their widest point, slightly broader than the prothorax but narrower than it at the base, sides subparallel, converging anteriorly, punctures finer than those on prothorax, very shallow, indistinct, each with a fine yellow bristle, further roughened, especially at base, by numerous large, shallow, irregular impressions. Length, 1.2 mm.; width, 0.4 mm.

Male.—Similar to female in general form and color, the punctuation of elytra and prothorax coarser, the larger impressions more nearly circular and serially arranged. Front slightly concave, epistoma at lateral angles produced into a distinct conical tubercle, the middle portion flat, the frontal angles as in the female; first ventral segment of abdomen with pubescent circular spot medially. Length, 1.2 mm.; width, 0.4 mm.

Described from one female and 2 males, Cayamas, Cuba, collected in January, February, and March by Mr. E. A. Schwarz.

Type.—No. 11564, U. S. National Museum; female; E. A. Schwarz, collector; Cayamas, Cuba.

***Cis bimaculatus*, n. sp. (Plate III, fig. 2).**

Female.—Elongate, bristling, brownish-yellow; prothorax darker and marked centrally with a large, subcircular, rufous spot; elytra marked at base with a blackish, transverse band extending about one-fifth their length, the remainder yellowish except for two distinct, circular, black spots, one on each elytron just anterior to vertex. Abdomen and legs rufous. Head brownish, slightly convex, with a faint, circular depression at vertex; front with many fine, deep punctures; epistoma broadly semielliptical, slightly elevated anteriorly, opaque, more sparsely punctured than front; angles of front short, extending very obliquely to the eye on either side. Prothorax slightly broader than long, sides broadly rounded, anterior margins broadly rounded and arched, base feebly sinuate; punctures very dense, regular, deep, each with a short bristle. Elytra twice as long as prothorax, slightly less than twice as long as wide; sides nearly parallel, slightly narrowed anteriorly, rather

acutely rounded posteriorly; punctures very numerous, finer than those of prothorax, regular, subserial in arrangement, each with a short, suberect bristle, producing a decidedly setose appearance. Length, 1.5 mm.; width, 0.6 mm.

Male.—Similar to female, except the epistoma, which has the lateral angles armed with a short, conical tubercle and the front slightly concave above the epistoma; first ventral segment of abdomen with a small, circular, pubescent area slightly anterior to its middle. Length, 1.5 mm.; width, 0.5 mm.

Type.—No. 11565, U. S. National Museum; female; E. A. Schwarz, collector; Victoria, Tex.

Fifteen females, 7 males; Victoria, Tex., March and April (E. A. Schwarz); Columbus, Tex., June (collectors Hubbard and Schwarz); Brownsville, Tex. (H. S. Barber); Cocoanut Grove (Biscayne), Fla., May, and Key West, Fla., April (collectors Hubbard & Schwarz).

Genus ORTHOCIS Casey.

Antennæ long, 10-jointed, third joint much elongate, longer than fourth, club rather small, loose and 3-jointed; prosternum well developed before the coxae, without a median carina; lateral edges of prothorax acute to apex; body elongate, glabrous, never setose or pubescent; apex of anterior tibiae always simple; head and prothorax not modified sexually; the only visible secondary male sexual character is a small, oval, opaque, and densely pubescent area at center of first ventral segment of abdomen, at the point occupied by a deep circular fovea in some species of *Cis*, to which this genus is closely allied although readily separated from it by the characters mentioned above.

Orthocis huesanus, n. sp. (Plate III, fig. 3).

Female.—Oval, glabrous, polished; prothorax piceous-black, slightly rufous anteriorly; elytra straw-yellow, with broad, piceous-black band either side the suture, expanded at base to the edges, much less so at apex, this band perpendicularly interrupted at its middle by a broad, transverse band of the same color, thus forming a Maltese cross on the dorsum; a very narrow dusky band also extends around the outer edge of each elytron from base to apex. Abdomen fuscous, legs amber, tibiae and tarsi darker. Head dark fuscous; front convex, minutely punctured; epistoma flat, opaque, punctured, its anterior margin blending laterally with the produced angles of front which extend on either side as broadly curved, entire elevations to the eye. Prothorax broader than long, sides broadly rounded, anterior margin constricted on either side, broadly rounded medially, punctures numerous, fine, circular, deep, regular. Elytra twice as long as prothorax,

about two and one-half times as long as broad, sides parallel, somewhat abruptly, broadly rounded posteriorly, punctures numerous, fine, impressed, arranged without order, less distinct than those of prothorax. Length, 1.7 mm.; width, 0.72 mm.

Type.—No. 11566, U. S. National Museum; female; E. A. Schwarz, collector; Key West, Fla.

Fourteen females, Key West, Fla., April (E. A. Schwarz). I have preserved Mr. Schwarz's manuscript name for this exceptionally fine species.

Orthocis pulcher, n. sp. (Plate III, fig. 4).

Female.—Elongate, glabrous, polished, straw-yellow to golden; prothorax considerably darker, with a large, subtriangular, black spot anteriorly; basal third of elytra black, the remainder yellow except for two large, irregular, dark rufous spots, one in each elytron, just anterior to vertex. Abdomen amber, legs of the same color, except that the tibiae are slightly darker. Head straw-yellow; front convex, centrally marked with a dusky blotch, punctures numerous, fine, deep, regular; epistoma opaque, not punctured, narrow, semielliptical, anterior margin slightly produced, entire, nearly straight, blending at lateral angles with produced angles of front, which extend as broadly rounded, elevated ridges on either side to the eye. Prothorax about as broad as long, sides broadly rounded, strongly tapering anteriorly, anterior margin strongly rounded, as is also the posterior margin, punctures numerous, large, coarser towards posterior margin, regular, deep. Elytra one and three-fourths times longer and more polished than prothorax, about one and three-fourths times as long as broad, sides subparallel, acutely rounded at apex, punctures fine, distinct, smaller and less dense than those of prothorax, subserial in arrangement. Length, 1.2 mm.; width, 0.4 mm.

Male.—Similar to female, but a trifle larger, punctuation of thorax and elytra slightly coarser, color darker throughout. Head not sexually modified, except that the epistoma is slightly elevated and the punctures of the front are more sparse anteriorly; ventral segment with a conspicuous, slightly elevated, subcircular disk near its middle. Length, 1.3 mm.; width, 0.4 mm.

Type.—No. 11567, U. S. National Museum; female; E. A. Schwarz, collector; Key West, Fla.

One female, 2 males, Key West, Fla., April (E. A. Schwarz); Punta Gorda, Fla., July, Cocoanut Grove, Fla., May (collectors Hubbard and Schwarz).

Genus ENNEARTHRON Mellié.

Antennæ slender, 9-jointed, the third joint equal to the 4th and 5th combined, 4th, 5th, and 6th joints subglobular, club rather feeble,

3-jointed; prosternum well developed before the coxae, without median carina; body elongate, cylindrical, glabrous; anterior tibiae thickened, externally rounded and spinulose at apex; secondary male characters usually pronounced, affecting both the epistoma (clypeus of Casey), angles of front, and apex of prothorax, varying in degree within the species according as the male is more or less well developed, the depauperate forms scarcely differing from the females, except that the first ventral segment of abdomen is marked medially near its posterior margin with a small, deep, pubescent fovea.

***Ennearthron transversatum*, n. sp. (Plate III, fig. 7).**

Female.—Elongate, glabrous, polished, nigropiceous to black, prothorax wholly dark colored, except that the anterior margin is slightly lighter, the elytra entirely black or nigropiceous except for two large, elongate, brownish-yellow spots half way between the base and vertex and more or less confluent at the suture, forming an irregular transverse band not attaining the margin. Abdomen pale rufous, legs amber. Head fuscous, the vertex piceous; front convex, with numerous fine, deep, regular punctures; epistoma opaque, feebly punctured, narrowly semielliptical, anterior margin truncate, entire, slightly produced beyond the produced frontal angles which proceed each side to the eyes as a strongly curved elevation. Prothorax broader than long, the sides strongly curved, base slightly rounded posteriorly, anterior margin rounded, somewhat prolonged over the head; punctures dense, coarse, deep, irregularly arranged, producing a decided roughened appearance. Elytra slightly more than twice the length of the prothorax and not quite twice as long as wide, sides broadly rounded, declivity very steep and convex, apex broadly abruptly rounded; punctures very dense, deep, irregularly arranged, not smaller than those of prothorax. Length, 1.2 mm.; width, 0.4 mm.

Male.—Similar to female in coloration, except that the yellow spots of the elytra are slightly more distinct; head and prothorax not modified, first ventral segment of abdomen with a subcircular, densely pubescent spot at the middle towards posterior margin. Length, 1.2 mm.; width, 0.45 mm.

Type.—No. 11568, U. S. National Museum; female; coll. Hubbard and Schwarz; Crescent City, Fla.

Four females, 2 males, Crescent City, Fla., Columbus, Tex., May, St. Catherine's Island, Ga., April (coll. Hubbard & Schwarz); Savannah, Ga. (E. A. Schwarz); Virginia Beach, Va. (A. D. Hopkins), January, 1908, bred from decaying rattan vines collected December 2, 1907.

***Ennearthron pallidum*, n. sp. (Plate III, fig. 6).**

Female.—Elongate, glabrous, polished, pale straw-yellow; prothorax darker, light brown anteriorly, more distinct and darker medially; base

of elytra with a broad, transverse, dusky band, as wide as the elytra and extending posteriorly for about one-fourth their length, the remainder pale dirty-yellow except for two indistinct, dusky spots near the apex of the declivity. Abdomen and legs yellow, claws brown. Head yellowish; front slightly convex, the punctures shallow, coarse, irregular; epistema opaque, brownish yellow, narrowly subquadrate, anterior margin protruding beyond produced frontal angles, which are strongly curved, very oblique, and join the epistema at its posterior lateral angles. Prothorax about one-fifth broader than long; sides broadly rounded, about equal to width of elytra at their base; rounded, base slightly curved posteriorly, anterior margin strongly rounded and slightly produced over the head; punctures shallow, dense, more so at sides. Elytra twice as long as the prothorax and not quite twice as long as wide, sides slightly rounded and constricted at base, apex broadly rounded, the punctures coarse, shallow, irregular, scattered, especially noticeable at base. Length, 1.2 mm.; width, 0.5 mm.

Type.—No. 11569, U. S. National Museum; female; coll. Hubbard and Schwarz; Haw Creek, Fla.

One female, Haw Creek, Fla., June (coll. Hubbard & Schwarz).

***Ennearthron annulatum*, n. sp. (Plate III, fig. 5).**

Female.—Oblong, glabrous, polished, straw-yellow; prothorax somewhat darker, its anterior half brownish; base of the elytra for about one-fourth their length with a transverse, piceous band which blends posteriorly with a similar band of straw color, the remaining portion of elytra dusky, somewhat paler than base. Abdomen and legs brownish yellow. Head straw color; front convex, coarsely punctured; epistema semicircular, opaque, brown, not punctured, slightly depressed, anterior margin feebly rounded, blending with frontal angles, which are more strongly curved. Prothorax broadly oval, slightly narrower than elytra, sides feebly rounded, anterior margin broadly curved and slightly prolonged over the head, posterior margin slightly curved; punctures numerous, shallow, finer anteriorly. Elytra narrow, twice as long as wide, sides subparallel, converging posteriorly so as to form a somewhat acute apex, punctures very numerous, distinct, shallow, coarse, especially at base. Length, 1 mm.; width, 0.4 mm.

Male.—Similar to female except that the anterior portion of the thorax is somewhat darker, the prothorax slightly broader proportionally, elytra more rugose. The head and prothorax present no secondary sexual modifications; first ventral segment of abdomen with a subcircular fovea medially. Length, 1 mm.; width, 0.35 mm.

Type.—No. 11570, U. S. National Museum; female; E. A. Schwarz, collector; Cayamas, Cuba.

One female, 1 male, Cayamas, Cuba, March (E. A. Schwarz).

EXPLANATION OF PLATE III.

(The antenna of each species, more enlarged, at left.)

FIG. 1. *Cis superbus.*
 2. *Cis bimaculatus.*
 3. *Orthocis huesanus.*
 4. *Orthocis pulcher.*
 5. *Ennearthron annulatum.*
 6. *Ennearthron pallidum.*
 7. *Ennearthron transversatum.*

A FURTHER NOTE ON THE SLOTH MOTH.*

By HARRISON G. DYAR.

Since presenting the description of *Cryptoses cholæpi*, the moth breeding in the hair of the sloth, two additional specimens were noted among the material recently collected by Mr. Wm. Schaus. This material is being held for Mr. Schaus to study when he returns from collecting, but in the present instance I take the liberty of noticing these specimens in order to present a description of the markings of the adult, which were entirely illegible in the original specimens.

Fore wing long and narrow, the apex produced, but pointed; dark bronzy brown, marked with longitudinal rays of shining pale ocherous, as follows: Costa and internal margin, a broad stripe from the middle of the cell to near the outer margin; a similar stripe on submedian fold from base to margin, not discoloring the fringe; short, obscure stripes between veins 2-3, 3-4, 4-5, and 7-8, the last stripe the longest. Hind wing uniformly dark gray, the scaling somewhat thin and semitransparent. Body parts clothed with short, shining, dark gray-brown, hairy vestiture. Antennæ of the male simple, smooth; palpi porrect, down-curved, closely and minutely scaled; legs with minute short vestiture of the same shining gray-brown color. Expanse, 17-18 mm.

Two males, one marked "Tuis, Costa Rica, 2400 ft., July, 1907"; the other, "parasite on sloth."

After having learned the appearance of fresh specimens, I discovered two such among Mr. Busck's material, captured at light at Tabernilla, Panama.

Sir George Hampson kindly informs me that I have overlooked a recent description of a sloth moth, *Bradipodicola*

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hahneli Spüler (Biol. Centralbl., xxvi, p. 690, 1906). Lord Walsingham has from Staudinger one of the original specimens taken by Hahnel in Brazil and, though in bad condition, thinks it is certainly the same species as my *Cryptoses cholæpi*, of which Mr. Schaus gave a specimen to the British Museum. However, as the specimen of *B. hahneli* is in bad condition and is a parasite on the other species of sloth, there is still a chance that we may have two species of sloth moths. Sir George refers the genus to the Schoenobiinæ, on account of the small tongue; he gives "tongue absent" as the character for that subfamily. I considered it to be present, but it is certainly very small. He also sends me a reference by Westwood to the occurrence of moths in the fur of the sloth (Trans. Ent. Soc. London, 1877, p. 436), which appears to be the earliest reference.

A NEW SATURNIAN MOTH FROM THE SOUTHWEST.*

By HARRISON G. DYAR.

A specimen standing under the name *Agapema galbina* in the National Museum collection for the last fourteen years was long since recognized as a distinct species, but no mate to it had ever been received. Now a male specimen has been sent by Mr. Roberto Müller from Mexico City, which, while more brightly colored, appears to be certainly the same species. It is accordingly characterized herewith:

Agapema homogena, n. sp.

Male.—Antennæ very broadly, doubly bipectinated, ocher-yellow. Body clothed with long blackish hair, paler at the tips of the segments, the feet reddish. Fore wings grayish black, finely interspersed with whitish hairs, the veins lined in carneous-ochraceous; inner line angled on the median vein, white, overspread with pink; discal mark ocellate, black-edged and black-centered, containing an orange-ocherous annulus and a blue crescent on its inner side; outer line white, rather broad and straight, with a narrow inner pink edging; outer margin white, shading to clay-color on the edge; a white subapical dash edged with crimson below and outwardly. Hind wing similar, the inner line wanting, the base broadly suffused with pink; discal mark with the lumen wholly or nearly occluded; outer line indented slightly on the veins; margin as on fore wings, the wing veins only obscurely pale-lined. Expanse, 65 mm.

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Female.—Similar to the male, but the lining of the veins much less distinct, except on vein 7 and the costa; all the colors are somewhat paler than in the male and the pink tint is wholly wanting, but this may be due to age. In consequence the basal space appears darker than the rest of the wing, while on the hind wing the base is whitish. The ocellate discal spots are more widely centered and larger, that of the hind wing having a distinct central lumen. Expanse, 78 mm.

One male, Mexico City, Mexico, March 1908 (R. Müller); one female, Fly Park, Chiricahua Mts., Arizona, 10,000 feet, June 9, 1894 (U. S. Dept. Agriculture).

Type.—No. 11871, U. S. National Museum.

THREE NEW BEES OF THE GENUS NOMADA.

By T. D. A. COCKERELL.

Nomada mera, n. sp.

Female.—Length, about 10 mm.; anterior wing, 8 mm. Red, rather sparingly marked with black; abdomen above with bright lemon-yellow markings, consisting of large pyriform lateral spots, the points directed mesad, on segments 2 and 3, and a pair of rather large spots on 5; no yellow on segment 4, or on venter; no yellow whatever on head, thorax, or legs; hair of face, cheeks, and sides of thorax, white; of head above, and scutellum, ferruginous; mandibles simple; face with a little black about ocelli and bases of antennæ, and hind part of cheeks black; antennæ entirely red, normal, long, the flagellum stout; joint 3 about two-thirds length of 4; mesothorax very densely and strongly punctured, with a single dark band; scutellum elevated, bigibbous; metathorax with a median black band; tegulæ bright ferruginous, punctured; wings with apical margin broadly fuscous; stigma dark, nervures black; b. n. going far basad of t. m.; second s. m. broad; anterior and middle femora black beneath at base; hind femora mainly black behind and beneath; first abdominal segment with a large black mark springing from the base on each side; pubescent band on apex of fifth segment narrow; pygidial plate broad and subtruncate. Close to *N. cressoni* Rob., but larger, and with no yellow on fourth abdominal segment.

Salina, Boulder County, Colorado, April 14, 1907 (W. P. Cockerell).

Nomada mera, var. a.

Female.—Differs by its paler coloration, the hind femora red behind, with at most a slight blackish suffusion; abdomen paler, without any evident blackish suffusion at sides of segments.

Clementon, New Jersey, May 6 and June 3, 1900; two received from Mr. Viereck, labelled *N. bisignata maculata*. As Robertson has shown, *Nomada maculata* Cresson was based on a mixture of species; he has restricted the name to the one with bidentate mandibles.

The specific name is derived from a Malay word meaning red.

***Nomada xanthura*, n. sp.**

Female.—Length about 9.5 mm. Red, with black markings; much yellow on the abdomen above, but none beneath, and none on head, thorax, or legs. Facial quadrangle about square; mandibles simple; much black around bases of antennæ, sending processes downwards and upwards, the latter narrowly connecting with the black about the ocelli; cheeks black posteriorly; antennæ normal, long and stout, red, except that the first four flagellar joints are strongly blackened above; *third joint barely shorter than fourth*; mesothorax and metathorax each with a median black stripe; scutellum moderately prominent; postscutellum black, with two red marks in the middle; tegulae red; wings strongly reddish, darker apically, and with a subapical clear spot; b. n. going a short distance basad of t. m.; third s. m. nearly as broad above as second; legs red, the femora black at base, hind femora much blackened; *anterior coxae behind with distinct but very minute and short spines*; first abdominal segment conspicuously narrower than second, black right across basally and without yellow; second with a very broad, bright-yellow band, interrupted by a slender red line in the middle; third with a basal yellow band, notched behind laterally; fourth with less yellow; *fifth with a very large quadrate yellow patch, the surface of which is shining*; band of tomentum on apex of fifth narrow; pygidial plate very broad and obtuse; venter red, with black and dusky markings, the most conspicuous being a transverse black mark at base of fifth segment; the scanty hairs of venter are dark. Allied to *N. denticulata* Rob., but easily separated by the characters italicised (except the coxal spines, in which it resembles *denticulata*).

Sea Cliff, Long Island, N. Y., May (Nathan Banks).

***Nomada (Gnathias) cornelliana*, n. sp.**

Male.—Length, about 10 mm. Abdomen long and narrow, rather light red, the second and third segments each with a large yellow patch on each side, but no other yellow on the abdomen; clypeus yellow, a little red above; lateral face marks consisting of rather broad bands which follow the orbital margin to the top of the eye, but only the lower part is yellow, the upper is red, and the red may extend to the occiput, behind the ocelli; third antennal joint distinctly shorter than fourth; scape clear red in front, black behind; flagellum clear red, the

first four joints with much black above; mesothorax black, with two red marks; varying to red with a broad black median band; scutellum red, prominent; postscutellum black marked with red, or red; metathorax black, with two red spots in the enclosure; legs red, the femora more or less blackened basally; wings strongly dusky at apex; stigma ferruginous, nervures ferruginous to fuscous. I first received a specimen (Lehigh Gap) from Mr. Viereck, and placed it as a variety of *N. perplexa*. A second example (Ithaca) appears to show that it is a distinct species, not very close to *perplexa*. In my table of *Gnathias* (Proc. Phila. Acad., 1903, p. 595) it runs to *N. physura* Ckll., from Nevada. It is in all respects very close to *physura*, but a little larger, with different lateral face-marks, and with the apical plate of abdomen strongly notched. It is possible that it is a variety of *N. bella*, in which the male has taken on much of the female coloration. The b. n., as usual in *Gnathias*, goes a long distance basad of the t. m.; the second s. m. is ordinary. The venter of the abdomen is red suffused with black; the base of the first dorsal segment is black. The pleura is marked with red, varying to nearly all red.

Ithaca, New York (Nathan Banks); Lehigh Gap, Pa., June 26 (Viereck). The darker specimen, from Ithaca, is taken as the type.

ADDITIONS TO THE LIST OF NORTH AMERICAN
GEOMETRIDÆ, WITH NOTES ON SOME
DESCRIBED SPECIES.

[Lepidoptera.]

By JOHN A. GROSSBECK.

The following embraces some of the species contained in an interesting lot of Geometridæ received from Dr. Harrison G. Dyar for identification. In the case of *Euphenolia pallimedia*, n. sp., the main material came to me from Dr. Henry Skinner, of the Academy of Natural Sciences, Philadelphia, some time previous to the receipt of the specimens from the National Museum. Most of the material came originally from Dr. William Barnes, but all the types, except a few which are retained in the author's collection, have been deposited in the National Museum.

Hydriomena manzanita Taylor.

Two specimens labelled Middle California. They are rather abraded and the ornamentation is so obscure that a different species is suggested; but a comparison with fresh examples

of *manzanita* in structure, color, and such markings as can be made out fails absolutely to separate them. The species has not been hitherto recorded off the Island of Vancouver, so the present specimens considerably extend its known range.

Cœnocalpe carnata Pack.

Two males from Middle California. Both of these agree more nearly with Packard's description of the species than anything I have seen, and additional material may show that the species generally passing in collections as *carnata* is distinct from it. Of the latter form I possess a series of 30 specimens from Stockton, Utah, and Fort Wingate, New Mexico, and none of them shows so clearly the bright carneous cross-bands, the outer of which contains a series of black venular dots.

Euphenolia pallimedia, n. sp.

Expanse, 13-14 mm. Front, vertex, except anterior portion, palpi, thorax, and abdomen reddish-brown; antennæ and anterior part of vertex pale yellow. Wings pale yellow, basal portion of primaries reddish-brown, the outer edge of which is oblique, extending from middle of costa or beyond, where it is more or less diffuse, to quite far in on inner margin. Outer third of wing crossed by a sinuous fascia of reddish-brown, broad on costa and becoming narrower toward inner margin, and bounded internally by the extradiscal line which is of a slightly deeper shade. A small portion of outer area not taken up by this fascia is of a deeper yellow than the center of the wing and the fringe is concolorous with it. Secondaries with outer third occupied by a broad band of reddish-brown, limited internally by the sinuous extradiscal line which can scarcely be separated from it, and externally by the bases of the yellow fringe. Sometimes a broken line of ground color runs through the band near its outer edge. Discal points on both wings small, occasionally absent. Beneath, as above, but the reddish-brown color a little fainter, especially that at the base of the primaries, and the extradiscal lines are more prominent in consequence.

Habitat.—Carr Canyon, Huachuca Mts., Cochise Co., Arizona, in August (Skinner); Wilgus, Cochise Co., Arizona (Barnes).

Types.—Male and female in the Academy of Natural Sciences, Philadelphia; co-types in the U. S. National Museum (No. 11872), in Rutgers College, and in my own collection.

A not distant relative of *Euphenolia skinnerata* Gross., with the same general type of maculation; but the color of the ornamentation is quite different in *pallimedia* and the cross-

lines are not nearly so well differentiated from the bordering shades as in *skinnerata*.

Cymatophora tenebrosata Hulst.

One male and 3 females, Huachuca Mts., Arizona, and Glenwood Springs, Colo. One specimen without locality, labelled June 8-15.

The species was originally described from 5 examples of each sex from various collections, but only a single type is now in the Hulst collection at New Brunswick. The specimens before me show considerable variation, ranging from a whitish-gray ground with a single cross-line, the extradiscal, to a ferruginous-gray ground with three distinct cross-lines.

Enypia griseata, n. sp.

Expanse, 30 mm. Head gray, at base of antennæ superiorly, white; upper portion of front brown, divided in the middle; thorax with mixed gray and white scales; abdomen wholly whitish. Primaries leaden gray over a whitish background, crossed by two narrow, scalloped, blackish lines, most distinct on the veins. Intradiscal line situated one-fourth out from base and consisting of four outward scallops; as a whole it is scarcely outcurved after the first bend from costa. Extradiscal line originating on costa about one-sixth in from apex and extending obliquely across the wing to the inner margin, ending one-third in from the anal angle; it consists of a series of inward scallops, those between veins M_1 and M_2 and between the anal vein and Cu_2 being larger than the others and projecting farther inward. Discal spot absent. Fringe checkered with blackish at the termination of the veins. Secondaries whiter than primaries, especially on basal two-thirds, and crossed by a single, inwardly-scalloped line, vaguely indicated except on the veins and at inner margin. Fringe whitish, marked at ends of veins by a distinct blackish spot. No discal spots. Beneath whitish, powdered with grayish on costal two-thirds of primaries and sparsely on costal and outer regions of secondaries. Extradiscal line showing faintly on fore wings. Fringe as above.

Described from 1 male.

Habitat.—Las Vegas Hot Springs, New Mexico (Schwarz & Barber).

Type.—No. 11873, U. S. National Museum.

This neat little species is allied to *Enypia packardata* Taylor. It differs markedly, however, from that species in that the gray scales which overlie the wings are evenly distributed and not formed into transverse striations as in *packardata*. The cross-lines, also, are narrower, not so deeply scalloped, and there is no indication of a discal spot on any of the wings.

The genus *Enypia* was erected by Hulst with *venata* Grt. as its type and is diagnosed as possessing a hair pencil on the hind tibia of the male. In *griseata* this character could not be found and an examination of the type species shows that it, too, is destitute of this structure, as are the remaining two species, *perangulata* and *packardata*.

Meris alticola Hulst.

Two males from Las Vegas, New Mexico, without date. The genus and species were described by Doctor Hulst from a single female (Trans. Am. Ent. Soc., XXIII, p. 348) and until now the male had not been discovered. I append a description of the male structure to supplement that of the female in the above mentioned publication.

Palpi short, porrect; tongue developed; antennæ bipectinate, the pectinations clavate and gradually growing shorter to a simple apex; patagia long haired; abdomen untufted; posterior femora fringed with long hair, posterior tibiae scarcely swollen, with all spurs, grooved, but destitute of hair pencil. Venation as in the female.

Therina hyalinaria, n. sp.

Expanse, male 20 mm.; female 35 mm. Head, palpi and anterior part of thorax pale yellow; posterior part of thorax and abdomen whitish. Both wings translucent; above and below uniformly whitish save for a faint yellowish tinge along costæ in male.

Described from 1 male and 1 female.

Habitat.—Southern Arizona (Poling).

This is a typical *Therina* and at once distinguished from its congeners by the perfectly immaculate wings.

Type.—No. 11874, U. S. National Museum.

Gonodontis subcineraria, n. sp.

Expanse, 28-30 mm. Head whitish or brownish, sometimes the front brown and the space between the antennæ whitish, becoming darker toward posterior edge of vertex. Thorax and abdomen brownish-cinereous. Ground color of wings soiled-whitish, heavily overlaid with brownish scales which take the form of transverse dashes closely arranged, and, with the ground color, give the wings a mottled brownish-cinereous appearance. In the female these dashes are not so pronounced, but there is a liberal scattering of dark-brown atoms, which are fewer in number in the male, over the wings. Primaries with two rather narrow cross-lines of the same general color as the brownish blotches; these are indefinite in two of the specimens at hand, but quite distinct in one male. The intradiscal line begins one-fourth out on the costa and extends outward toward center of wing to the

cubital vein, being slightly angled on the radial vein; from cubitus it bends inward and runs obliquely with a gentle inward curve to inner margin. The extradiscal line begins one-fourth in from apex, extends outward in a straight line nearly to M_1 , then bends sharply inward, forming a right angle to the first part and runs in an almost straight line to inner margin. The two lines divide the inner edge into three equal parts. Discal spot brown, distinct, not very large. Secondaries with a single, outwardly curved median line extending from inner edge two-thirds across the wing, being scarcely traceable in the female. Discal spot absent. Beneath soiled-whitish, with a faint yellowish cast, the transverse dashes of above heavily reproduced, especially on primaries and more profuse on outer third of both wings. Small discal spots on both wings.

Described from 2 males and 1 female.

Habitat.—Southern Arizona (Poling).

Type.—No. 11875, U. S. National Museum.

This species falls in that section of *Gonodontis* which contains *distycharia* Gn. and *antidiscaria* Walk. and is in fact nearly related to the former. Like *distycharia* it appears subject to considerable variation, but may be readily separated by the mottled wings and the absence of a pale yellow edging with which both lines of *distycharia* are bordered.

Sabulodes amplicineraria Pears.

Three males, Southern Utah (Poling). In the absence of a male the species was tentatively referred to *Sabulodes* by Mr. Pearsall. Males now in hand show the reference to be correct. Examples were taken not uncommonly during the season of 1907 by Mr. Tom Spalding at Stockton, Utah, in June, August, and September.

Sabulodes ligata, n. sp.

Expanse, 33-37 mm. Head, thorax, and abdomen ochreous white. Wings concolorous, well scattered over with blackish atoms, slightly transverse in position, and with faint transverse buff colored dashes, most evident on primaries between the two cross-lines. Intradiscal line of primaries one-third to one-fourth out from base, brown or ochreous in color and edged internally by a clear line of ground color; it extends a little inwardly obliquely, scarcely curved, but angled outwardly on anal and cubital veins; costally this line is obsolete. Extradiscal line of same color as intradiscal and bordered with a band of ground color externally; it begins narrowly on costa less than 4 mm. in from apex, curves inward a short distance below origin, and extends straight or slightly outcurved to inner margin, ending over one-third in from anal angle. Discal spot moderate in size, brown. Secondaries

with a single median line, continuous to and concolorous with the extradiscal line of fore wings. Discal spot moderate in size, brown. Beneath pale creamy yellow, with a scattering of brown atoms and with the cross-lines of above feebly reflected. Discal spots present.

Described from 2 males.

Habitat.—Huachuca Mts., Arizona, in June.

Type.—No. 11876, U. S. National Museum.

The above describes more particularly the specimen I have made type; in the co-type the cross-lines are brown instead of ochreous, the intradiscal line of primaries is located nearer the discal spot, and the angles on the veins are scarcely obvious, while the extradiscal line of both wings is a little outcurved. There is no doubt, however, but that they are one species, as similar differences occur throughout the group to which it belongs.

Superficially the species resembles some of the paler varieties of *Caberodes confusaria* Guen., but the angulated or almost straight intradiscal line immediately separates it from that species. It is, furthermore, a typical *Sabulodes* with simple, flattened antennæ in the male.

***Sabulodes dyari*, n. sp.**

Expanse, 32 mm. Front and palpi reddish-brown; vertex, antennæ, thorax, and abdomen yellowish. Wings yellowish, with a deep-orange cast, especially outwardly, and sparsely sprinkled over with minute, blackish atoms. Two orange-colored lines of a medium breadth cross the primaries, the intradiscal and extradiscal. The first of these begins at the radial vein one-third out from base and extends in an almost straight line to inner margin, being directed slightly outward; the second begins very faintly on costa one-fourth in from apex and extends obliquely inward and without curve, except an almost imperceptible one just below costa, to inner edge, the distance between them near the costa about twice as great as that on the inner margin. Sub-terminal line absent; fringe orange. Discal spot brown, distinct, not large. Secondaries with a single slightly curved line traversing the center of the wing from inner margin to radial vein, where it ceases abruptly. Discal spot small, faint, just within cross-line. Beneath, both wings pale creamy-yellowish, darker on anterior two-thirds of primaries and sparsely sprinkled over with brown atoms; discal spots small, distinct. No indication of cross-lines.

Described from 1 male.

Habitat.—Huachuca Mts., Ariz., July 24–30.

Type.—No. 11877, U. S. National Museum.

Nearest to *Sabulodes novellata* Hulst, but the apex and angulation of primaries on vein M_1 are very much less acute

than in that species and the intradiscal line is straighter, approaching the extradiscal toward inner margin. The deep orange-yellow shade of the ground in *dyari* is probably never attained by *novellata*.

Destutia, n. gen.

Palpi short, porrect, projecting a little beyond the front; tongue developed; front rounded, slightly produced, smooth; antennae of male simple, naked, flattened; thorax and abdomen untufted; posterior tibia of male thickened but without hair pencil, with two pairs of spurs; fore wings obtusely angled at M_2 , apex acute, falcate, twelve veins, two accessory cells, R_s from end of cell, R_s and R_4 stemmed, R_s from cell, M_1 from near base of second cell; hind wings with seven veins, subcosta separate from radius, radius not stalked with M_1 .

This genus is allied to *Sabulodes* Guen., differing chiefly in the absence of the hair pencil on the hind tibia.

Type.—*D. novata* Gross.

Destutia novata, n. sp.

Expanse, 35-40 mm. Head, thorax, abdomen, and wings above ochreous, the posterior wings somewhat paler than the anterior ones, both wings more or less finely mottled by darker shadings of the same general color. Two purplish-brown lines of moderate breadth cross the primaries; the intradiscal one-fourth out from the base is shortly outcurved from costa, then runs almost straight to inner margin; the extradiscal line leaves the costa 3 or 4 mm. from the apex (according to size of moth), curves gently outward a short distance, then faintly inwardly obliquely to inner edge. The two lines divide the inner margin into three almost equal parts. The extradiscal line in one specimen is edged externally by a narrow, incomplete, white line which shows plainest near the costa and on the veins. Secondaries with a single extradiscal line, continuous to that of the fore wings, obsolete at costa, slightly out and incurved, and ending a little outward of the center of the inner margin. A brownish discal spot on both wings, that of primaries being largest. Beneath somewhat paler than above, sparsely brown speckled, especially along the costæ. Discal spots present, prominent. Transverse lines of above showing rather strongly on primaries, much less so on secondaries.

Described from 2 males.

Habitat.—Huachuca Mts., Arizona, May 8-15.

Type.—No. 11878, U. S. National Museum.

A REVIEW OF THE NORTH AMERICAN CHRYSAGINÆ.*

[Lepidoptera, Pyralidæ.]

By HARRISON G. DYAR.

This subfamily of Pyralidæ is represented in North America by but few species, nearly every one of which belongs to a separate genus. Several species had accumulated in the collection of the National Museum which it was desirable to place, and to do so I have made a cursory review of our species, with the following result:

TABLE OF THE GENERA OF CHRYSAGINÆ OCCURRING IN NORTH AMERICA.

Hind wing with the veins all present.

Fore wing with veins 2-3 stalked, 4 and 5 from the cell.....*Galasa*.

Fore wing with veins 2 to 5 from the cell.

Fore wing with vein 10 arising from the stalk.

 Palpi upturned to vertex.....*Tosale*. Palpi porrect, downcurved*Chaliniis*. Fore wing with vein 10 arising from the cell.....*Salobrena*.

Fore wing with veins 4-5 stalked.

 Fore wing with 12 veins*Clydonopteron*.

Fore wing with 11 veins.

 Fore wing with vein 11 anastomosing with 12.*Xantippides*. Fore wing with vein 11 free.....*Arta*.

Hind wing with vein 4 absent.

Fore wing with vein 11 anastomosing with 12, 10 absent,
Condylolomia.

Fore wing with vein 11 free.

Fore wing with 12 veins.

Fore wing with vein 10 arising from the stalk.

 Hind wing with veins 3, 5 separate.....*Amestria*.

Hind wing with veins 3, 5 stalked.

 Fore wing with vein 3 from the angle of the cell,
Caphys. Fore wing with vein 3 stalked with 4 and 5,
Artopsis. Fore wing with vein 10 arising from the cell.....*Satole*.

Fore wing with 11 veins.

 Fore wing with veins 4 and 5 stalked, 3 from the cell,
Acalis. Fore wing with veins 3 to 5 stalked.....*Parachma*.

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Genus GALASA Walker.**Galasa rubidana** Walker.

This well-known species ranges from Florida and Texas to New Hampshire and the Rocky Mountains. References may be found in Hampson's work on the Chrysauginæ (Proc. Zool. Soc. London, 1897, pp. 633-692) and in Bulletin 52, U. S. National Museum.

Genus TOSALE Walker.**Tosale oviplagalis** Walker.

This species has a range similar to the preceding, but does not extend so far to the North. Specimens are before me from Florida, Texas, North Carolina, Maryland, Pennsylvania, and Illinois. I have also a single female from southern Arizona (Poling).

Genus CHALINITIS Ragonot.**Chalinitis olealis** Ragonot.

I have no specimens of this species, but the venation given by Hampson and the figure of Ragonot indicate a very distinct form.

Genus SALOBRENA Walker.

The synonymy of this genus is given wrongly in Bulletin 52 of the U. S. National Museum. *Ectoperia* Zeller is properly a synonym of it as given by Hampson, but *Clydonopteron* Riley should be distinct. Fernald is right in giving two genera for *tecoma* Riley and *sincera* Zeller, but he used the wrong names.

Salobreña sincera Zeller.

My specimens are all from Texas, two originally collected by Belfrage and others received later from Brownsville, collected by Messrs. C. H. T. Townsend and H. S. Barber.

Genus CLYDONOPTERON Riley.**Clydonopteron tecoma** Riley.

Besides Riley's types, I have a number of specimens from the vicinity of Washington, D. C., and two from Agricultural College, Mississippi, taken by Mr. Glenn W. Herrick. The larvae feed in the seed pods of *Tecoma*. This is the only species of North America Chrysauginæ of which anything is known of the early stages, with the exception of one new species, hereinafter described.

Genus XANTIPPIDES, n. gen.

Fore wing with vein 2 from well before the angle of the cell, 3 from near the angle, 4-5 long-stalked, 6 shortly stalked with 7 to 9, 7 given off before 9, 10 absent, 11 anastomosing with 12 and separating again; hind wing with vein 2 from before the angle of the cell, 3 to 5 stalked, 6 from the upper angle of the cell, 7 anastomosing with 8. Palpi small, upturned, not reaching the vertex.

Type.—*Xantippe descansalis* Dyar (Proc. Ent. Soc. Wash., X, Nos. 1-2, p. 58, 1908).

Xantippides descansalis Dyar.

Known to me only by the types from San Diego, California.

Genus ARTA Grote.

Arta statalis Grote.

Nearly all my specimens are from Arizona (Huachuca Mts., and Wilgus, Cochise County), all but one having come through Doctor Barnes. One bears only the number 375, but I think it is from Los Angeles, Cal. (D. W. Coquillett). The species may prove to be a synonym of *Parachma ochracealis* Walker, which comes from the same region and is like it in color and markings, but differs in having veins 4 and 5 of the hind wings coincident instead of stalked. This may be a case of variability in venation only.

Arta olivalis Grote.

I have one specimen from Texas, Belfrage's original collecting, and another taken on Plummers Island, Maryland, by Mr. August Busck.

Genus AMESTRIA Ragonot.

Amestria oculiferalis Ragonot.

Not known to me, but should be easily recognizable from Ragonot's figure.

Genus CAPHYS Walker.

Caphys bilinea Walker.

Known from Brazil, Venezuela, the West Indies, and Central America; it also extends into Arizona, whence I have specimens labelled So. Arizona (Poling), and Nogales, Arizona, July 7 and 30 (E. J. Oslar). References and synonymy will be found in Hampson's paper (page 678); this is the first record of this as a North American species. The specimens before me vary remarkably in size.

Genus ARTOPSIS, n. gen.

Fore wing with vein 2 from well before the angle of the cell, 3 to 5 stalked, 6 from below the upper angle of the cell, 7 to 10 stalked, 9 and 10 being on a common stalk in one specimen, separate in another, 11 free, arising from the cell before apex; hind wing with vein 2 from before the angle of the cell, 3 and 5 long-stalked, 4 absent, 6 from the upper angle of the cell, 7 anastomosing with 8. Palpi small, slender, upturned, not reaching vertex.

Artopsis borregalis, n. sp.

Fore wing ochraceous, overspread with purplish cinereous, leaving two rather broad, distinct, curved, pale lines; hind wings pale, with a faint, outer, curved, paler line. Expanse, 13 to 15 mm.

Four specimens, Brownsville, Texas, "Los Borregos," June, 1905 (H. S. Barber.).

Type.—No. 11921, U. S. National Museum.

Genus SATOLE, n. gen.

Fore wing with vein 2 from well before the angle of the cell, 3 at the angle, 4 and 5 stalked, 6 from the upper angle of the cell, 7 to 9 stalked, 10 and 11 from the cell, free; hind wing with vein 2 from well before the angle of the cell, veins 3 and 5 separate, 4 absent, 6 from the upper angle of the cell, 7 anastomosing with 8. Palpi in the male slender, sharply upturned, and reaching above the vertex; in the female porrect, the tip dependent, the second joint thickened with scales above.

Satole ligniperdalis, n. sp.

Male with the costa enlarged at the base and folded over to form a pouch as in *Tosale ovipagalis* Walk. Blackish gray, the basal space especially blackish; lines slender, white, distinct although very narrow, both excurved mesially, parallel, dividing the wing into three areas of nearly equal width; faint indications of two darker rounded discal dots, one in the cell and one at the end; mesial space somewhat lighter next to the inner line. Hind wing dark gray, the fringes dark, with a double blackish line at their base. Coloration of the sexes alike. Expanse, male, 18 mm.; female, 22 mm.

Nine specimens, Portal, Arizona, bred from larvæ boring in the solid wood of "desert willow" (*Chilopsis linearis*), issued June 28, 1907 (U. S. Dept. Agriculture, Hopkins, U. S. 5587).

Type.—No. 11922, U. S. National Museum.

Mr. Webb has handed me a vial containing two of the larvæ of this species. They are short and robust, whitish

without markings, the head pale luteous, clypeus dark brown, the mandibles, a spot on each side of clypeus, and antennæ also brown. The feet are very short, those of joints 7 to 10 represented by complete, rather broad ellipses of crochets, the last pair by a line of crochets. Spiracles black-ringed. Tuberclæ very minute, iv and v approximated substigmatically on a common chitinized but colorless area, normal. Skin smooth, the segments triannulate, distinctly so.

Genus ACALLIS Ragonot.

Acallis grifhalis Hulst.

I have two males from Fort Collins, Colorado (C. P. Gillette), numbered 2573 Agr. College. Also a female specimen from Williams, Arizona, July 10 (H. S. Barber) which is much larger than the males and has the outer line farther from the margin.

Genus PARACHMA Walker.

Parachma ochracealis Walker.

I have specimens from Huachuca Mts. and Santa Rita Mts., Arizona (Dr. Barnes). (See remark under *Arta statalis*, p. 94.)

Genus CONDYLOLOMIA Grote.

Condylolomia participalis Grote.

I have specimens from Cohasset, Mass. (O. Bryant), New Brighton, Pa. (F. A. Merrick), Pittsburgh, Pa. (H. Engel), and Plummers Island, Maryland (A. Busck).

A REVIEW OF THE NORTH AMERICAN PYRALINÆ.*

[*Lepidoptera, Pyralidæ.*]

By HARRISON G. DYAR.

Having had occasion to transfer the moths of this subfamily to new drawers in anticipation of moving the National Museum collection to the new building, I used the opportunity to rearrange them and determine the unnamed specimens. The subfamily is represented by but few species in our region, falling into six genera, separable as follows:

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KEY TO THE GENERA OF NORTH AMERICAN PYRALINÆ.

Median vein of hind wing without pecten of hairs on the upper side; maxillary palpi filiform.

Palpi with the second and third joints upturned.

Proboscis absent or minute.....*Aglossa*.

Proboscis well developed.

Fore wings with vein 7 from 8 before 9.....*Pyralis*.

Fore wings with vein 7 from 8 after 9.....*Hypsopygia*.

Palpi obliquely upturned, the third joint porrect.....*Herculia*.

Palpi rostriform and downcurved at extremity.....*Omphalocera*.

Median vein of hind wing with pecten of hairs on upper side; maxillary palpi triangularly scaled.....*Uscodys*.

Genus AGLOSSA Latreille.

Aglossa cuprealis Hübner.

The species ranges from Maryland southward in the United States. The specimens before me agree well with European ones.

Lloyds, Md., July 10, 1907 (H. S. Barber); Plummers Island, Maryland, June 3 (A. Busck); District of Columbia, July 2, 1888 (T. Pergande); Pittsburg, Pa., June 8 and 18, 1906 (H. Engel); New Brighton, Pa., July 8, 1902 (H. D. Merrick); "corn Pyralis, Treat;" Raleigh, N. C., June 28, 1907 (H. S. Brimley); Eufaula, Ala. (C. V. Riley).

Aglossa cuprina Zeller.

Sir Geo. Hampson places this species in *Pyralis*, but my specimens have the tongue aborted. Possibly Sir George has made a different identification. If I am correct the species is easily to be told from *cuprealis* by the strong exertion of the inner line on submedian fold, which contains an elliptical dark patch, looking like an elongated replica of the discal mark.

Center Harbor, N. H. August 3, 1902 (H. G. Dyar); Plummers Island, Md., June 5 to July 10 (Schwarz, Barber, Busck); Pittsburg, Pa., July 11, 1905 (H. Engel); Rhinebeck, N. Y., August 3, 1890 (H. G. Dyar); Tryon, N. C., August 2, 1903 (W. F. Fiske); "416L" (C. V. Riley); St. Louis, Mo., September 8, 1904 (H. McElhose); Texas, July 7 (Belfrage). The last specimen was submitted to Ragonot in 1884, who identified it as *Aglossa cuprealis*, but wrongly, in my opinion.

Aglossa acallalis, n. sp.

A small, frail species with very long fringes; reddish, powdered with black as in *cuprina* Zell., the lines blackish, broad, edged with pale

yellowish, both mesially excurved and feebly dentate, but smooth and even in comparison with the lines of the other species; fringes silky gray. Hind wing pale grayish, with a darker irregular mesial line far removed from the margin. Expanse, 16 to 20 mm.

Three specimens, Williams, Arizona, July 9 and 19 (H. S. Barber); Ashfork, Arizona, June 18 (H. S. Barber).

Type.—No. 11924, U. S. National Museum.

Genus PYRALIS Linnaeus.

Pyralis farinalis Linnaeus.

Distributed throughout the United States.

Pyralis costiferalis Walker.

I have three specimens that agree well with Walker's description.

New Brighton, Pa., July 2, 1905 (H. D. Merrick); Pittsburgh, Pa., June 23, 1905 (H. Engel); ——— (C. V. Riley).

Pyralis disciferalis, n. sp.

Fore wing reddish ocherous, irrorate with blackish; costal edge blackish except where cut by the lines; discal spot large, blackish, subquadrate; lines ocherous, slightly intensified on the costa, strongly edged toward the median space with blackish, the inner slightly angled on median vein and produced inward on submedian fold, the outer mesially excurved, obscurely dentate; a row of black points at the base of the fringe. Hind wing ocherous, reddish shaded, usually with an extra mesial dark line and row of dots in the fringe. Expanse, 16 to 23 mm.

Twenty-four specimens, Plummers Island, Maryland, June 5 to August 18 (Schwarz, Busck, Barber, Warner); Pittsburgh, Pa., July 20, 1906 (H. Engel); New Brighton, Pa., June 20, 1902 (H. D. Merrick); Chicago, Ill. (A. Kwiat); Travilah, Md. (F. C. Pratt); Black Jack Springs, Texas (W. Barnes); Kerrville, Texas, May, 1900 (H. Lacy); Somerville, S. C., April (R. Ottolengui).

Type.—No. 11925, U. S. National Museum.

Allied to *P. costiferalis* Walk., but the costal markings are not more developed than the cross-lines. Especially the basal costal mark does not exceed the subcostal vein, whereas in *costiferalis* it extends to the median vein.

A specimen was sent to Prof. C. H. Fernald in 1901, but still remains with him unidentified. I venture to enforce the statute of limitations on a seven years basis and identify the species myself.

***Pyralis electalis* Hulst.**

Ariz. (*Aglossa* n. sp.? Ragonot, 1884; still undescribed, acc. to Rag. '86); Santa Rita Mts., Ariz., June 11, 1898 (E. A. Schwarz); Huachuca Mts., Arizona (Wm. Barnes); Las Vegas Hot Springs, New Mexico (Schwarz & Barber); southern Utah, July, 1900 (O. C. Poling).

***Pyralis manihotalis* Guenée.**

Pyralis manihotalis Guenée, Spec. Gen. Lep., VIII, p. 121, 1854.—Cayenne [French Guiana].

Pyralis vetusalis Walker, Cat. Brit. Mus., XIX, p. 891, 1859.—Santo Domingo.

Pyralis gerontesalis Walker, Cat. Brit. Mus., XIX, p. 896, 1859.—Ceylon.

Sacatia laudatella Walker, Cat. Brit. Mus., XXVII, p. 124, 1863.—Ceylon.

Pyralis despectalis Walker, Cat. Brit. Mus., XXXIV, p. 1243, 1865.—Moreton Bay [Australia].

Pyralis? miseralis Walker, Cat. Brit. Mus., XXXVII, p. 1244, 1865.—Moreton Bay.

Pyralis achatina Butler, Ent. Mo. Mag., XIV, p. 49, 1877.—Hawaiian Islands.

Pyralis manihotalis Hampson, Trans. Ent. Soc. Lond., 1896, p. 509.—Neotropical, Oriental, and Australian regions.

This species was not included in Bulletin 52, U. S. National Museum, so I give the synonymy in full, after Hampson. I have before me 4 specimens taken at Miami, Florida, by Mr. Schaus and named by him at the British Museum.

Genus **HYPSSOPYGIA** Hübner.

***Hypsopygia costalis* Fabricius.**

Atlantic States and Mississippi Valley from Wisconsin to Texas.

Genus **HERCULIA** Walker.

***Herculia planalis* Grote.**

This species was described from Colorado. I have two specimens before me from Kerrville, Texas, May, 1906, and May, 1907 (H. Lacy).

***Herculia intermedialis* Walker.**

Hampton, N. H., July 29, 1905 (S. A. Shaw); Plainfield, N. J. (Mrs. F. O. Herring); Chicago, Ill. (A. Kwiat); New

Brighton, Pa., July 1, 1905 (H. D. Merrick); Plummers Island, Maryland, June 5, 19 (Schwarz, Busck); Tryon, N. C., May 13, 1903 (W. F. Fiske).

Herculia phoezalis, n. sp.

Dark brown with a vinous tint, fringes concolorous; lines blackish toward the median space, edged with yellowish outwardly, the inner angled on median vein, the outer more distinct on costa, evenly excurved mesially; a row of terminal blackish dashes nearly forming a line. Hind wing with less vinous tint than the fore wing, but equally dark, crossed by a curved whitish extra-mesial line, well removed from the margin; fringe as on fore wing, with a black central line. Beneath grayish, the terminal space paler and vinous shaded, the outer common line repeated, dark, edged with pale, emphasized on the costa of fore wing; a row of terminal triangular blackish dots. Expanse, 17 to 25 mm.

Thirteen specimens, Los Angeles Co., Cal., May (A. Koebele); Los Angeles Co., Cal. (D. W. Coquillett); Santa Monica, Cal. (J. J. Rivers).

Type.—No. 11927, U. S. National Museum.

Mr. Koebele's specimens are labelled "old branches of *Cupressus* and fresh bark of orange;" Mr. Coquillett's bear the letter "G," presumably referring to breeding notes.

A specimen of this species was sent to Prof. C. H. Fernald in 1898, with permission to describe it, if new. He has never reported on it, nor returned the specimen, and I trust he will forgive me for taking the matter into my own hands after the lapse of ten years.

Herculia cohortalis Grote.

This species is not before me. Described from Colorado and apparently allied to the following.

Herculia thymetusalis Walker.

I have but a single specimen of this species, from the Adirondack Mts., N. Y. (W. W. Hill).

Herculia binodulalis Zeller.

I have identified as this species two specimens from Kerrville, Texas, November, 1906 (H. Lacy).

Herculia infimbrialis, n. sp.

Pale stramineous-ochraceous, the costa of fore wings darker, the fringe concolorous, not yellow. The lines start from triangular yellow costal blotches, and appear dark, their narrow vinous-brown edges

being well relieved, the pale lines themselves scarcely distinguishable from the ground color. Hind wing with two approximated dark lines. Expanse, 27 mm.

Two females, Glenwood Springs, Colorado, July 16-23 (Wm. Barnes); Clear Creek, Col., July 18, 1904 (E. J. Oslar).

Type.—No. 11928, U. S. National Museum.

Near to *binodulalis*, but distinguished by the *dark* lines on both wings.

Herculia himonialis Zeller.

I think this is not more than a variety of *olinalis* Guen.; the position of the lines on the hind wing seems to vary.

My specimens are mostly from Texas and Colorado, though some from the Atlantic Coast region agree very well.

Herculia olinalis Guenée.

Common in the Atlantic Coast region from Rhode Island to Texas, westward to the Mississippi valley. I have a specimen from Las Vegas Hot Springs, New Mexico (H. S. Barber) that seems referable here rather than to *himonialis*, although somewhat intermediate in the position of the lines.

Genus *OMPHALOCERA* Lederer.

Omphalocera cariosa Lederer.

I have specimens from Maryland, North Carolina, and Alabama, the larvæ on pawpaw; the range probably extends throughout the Mississippi Valley. The larva is black with many white dots, a broad dull red dorsal and lateral stripe, the former expanded on the centers of the segments.

Omphalocera dentosa Grote.

New Haven, Conn. (A. H. Verrill); Plummers Island, Maryland, June 6, 1902 (H. S. Barber); Ames, Iowa, June 6, 1896 (C. P. Gillette); Black Jack Springs, Texas (Wm. Barnes); Dallas, Texas, May 31, 1896 (Dept. Agr. no. 6351), larvæ on *Berberis*. I have also a female from Durango, Colorado, that is less vinous in tone and more darkly colored, perhaps a distinct species, but with the present material I do not venture to separate it.

Larvæ received from Mr. A. H. Verrill, which I think belong to this species, are black with many white dots, without the red lines of *cariosa*.

Genus *USCODYS*, n. gen.

Median vein of the hind wings weakly pectinate on the upper side; maxillary palpi broadly triangularly scaled; labial palpi long, porrect,

drooping, the second joint with long scales below; tongue rudimentary. Fore wing with veins 2 to 4 separate, 6 from near the upper angle of the cell, 7 to 9 stalked, 10 and 11 from the cell, free. Hind wing with the cell long, 2 to 5 separate, 6 and 7 from upper angle of the cell, 8 running close to 7 but not anastomosing.

Type.—*Anerastia cestalis* Hulst (lately referred to *Aglossa*).

According to Sir G. F. Hampson's table, this genus would fall in the Crambinæ, but I have given more weight to the venation than to the hair-pecten of the hind wing and scaling of the maxillary palpi, which I think are more superficial characters, and accordingly place the genus in the Pyralinæ.

Uscodys cestalis Hulst.

Oracle, Arizona, July 11 (E. A. Schwarz); Tucson, Arizona, June 22 (E. A. Schwarz); Ariz., sent to Lord Walsingham and labelled by him "Pyralidina" 4747 Wlsm. 1906.

Uscodys atalis, n. sp.

Similar to *cestalis* Hulst, the markings of the fore wing being practically identical. The species is smaller, the color of the fore wings brighter gray without a brown tint, the abdomen and hind wings whitish scaled, not fuscous, the hind wing powdered with gray outwardly and with a blackish terminal line. Expanse, 20 to 22 mm.

Nineteen specimens, Yuma Co., Ariz., desert, March 26, April 10 (W. D. Kearnott); southern Arizona, May 15-30 (O. C. Poling); Yavapai Co., Ariz.; Walters Station, Cal., April 1; Sapelo Canyon, New Mexico, July 27, 1902 (E. J. Oslar); Gallinas Canyon, New Mexico (E. J. Oslar).

Type.—No. 11929, U. S. National Museum.

The specimens have all come through the kindness of Mr. Kearnott. His various attempts to name the species are attested by a number of labels, which bear witness to the aberrant character of this confusing species. One label reads "close to *Salebria*, probably new," another "*talis?* probably," this last attributed to Professor Fernald and presumably referring to Grote's "bright purple" *Botis talis* from Alabama, through what confusion it would be hard to say.

TWO NEW SPECIES OF NORTH AMERICAN TINGITIDÆ.

[Hemiptera—Heteroptera.]

(PLATE IV.)

By OTTO HEIDEMANN.

***Acysta perseæ*, n. sp.**

Colors sharply contrasting, shining black and yellowish white. Head short, closely set into thorax, black except the two small, converging spines in front and the narrow bucculae on the underside, which are yellowish white; surface between eyes convex and somewhat rugulose, a little impression at base near them; antenniferous tubercles blunt but prominent. Eyes dark brown, strongly faceted. Antennæ slender, somewhat longer than distance from front of head to apex of posterior portion of pronotum; basal joint not much longer than second, both only slightly thicker than third; fourth joint dusky towards tip. Rostrum yellowish, nearly reaching meso-metasternal suture. Thorax black and shining, strongly punctured, moderately convex, transversely impressed near front, thence the sides narrowing abruptly towards anterior margin, the latter with a narrow yellowish rim; pronotum without a hood and with only one median carina; membranous lateral margins of thorax nearly obliterated, visible only as two very small ear-like expansions near shoulders, translucent, yellowish white, bearing a few minute round cells; tip of posterior portion of pronotum of same color and closely reticulated. Elytra oblong-oval, much longer than abdomen, somewhat narrowing towards apex, rounded at tip, translucent, yellowish white, with a transverse black vitta near the middle which becomes broadest at the discoidal areas, and beyond the latter a few nervures infuscated; discoidal area apparently not closed posteriorly by a raised nervure, barely wider than the subcostal area, both closely reticulated with very small areoles; costal margin about as broad as the discoidal area, with rows of three or four areoles at its widest part, these areoles increasing a little in size towards apex of elytra. Wings attaining tip of abdomen, highly iridescent. Body black, shining, sparingly pubescent. Rostral groove uninterrupted, the marginal laminæ not strongly raised, yellowish; metasternum black, highly shining, transverse, flat. Last abdominal segment in the female broadly rounded at apex; in the male, oblong, a small round fovea on sides and strongly curved claspers at tip. Legs yellowish white, except the claws, which are blackish. Length, 2 mm.; width, 0.8 mm.

Described from two specimens, male and female. In addition I have examined some others, and a few larval forms. Eustis, Fla., July 15, 1897 (H. J. Webber); Ft. Meyers, Fla.,

July 27, 1906 (A. W. Morrill); Cutler, Fla., August 14, 1900; Baldwin, Fla., March 10, 1879 (E. A. Schwarz); Orlando, Fla., August 15, 1907; Miami, Fla., February 2, 1908 (Wester); St. George, Fla., April 20, 1880 (Turner); New Orleans, La., October 25, 1907 (La. Exp. Sta.).

Type (from Miami, Fla., female and male).—No. 11860, U. S. National Museum. This neat little tingitid is most nearly allied to G. C. Champion's *Acysta interrupta*, recorded from Panama. The latter species, however, differs in having three pronotal carinæ and the membranous lateral margins interrupted only in the middle; besides, the nervures in that species closing the discoidal areas are well defined.

The U. S. National Museum possesses several specimens from Florida which have been found infesting *Persea carolinensis* and *Persea gratissima* (alligator pear or avocado), and other specimens coming from New Orleans, La. (La. Exp. Sta. a. c. 457) are labeled "living on camphor trees (*Camphora officinalis*)."

Eggs were examined on foliage of avocado twigs. They were deposited on the underside of the leaves, standing upright in irregular rows; they are of the usual tingitid egg shape, of a dull yellow color with a white rim to the lid. Each egg is more or less thickly covered by a dark, sticky secretion from the insect.

Nymphs, probably in the fifth stage of their development.—Body oblong-oval, dark yellowish, except towards base of abdomen where the color becomes lighter with some scattered small reddish spots. On each abdominal segment, on each side near the lateral margins arises directly from the surface a peculiar prolongation in the shape of a cylindrical process; the two on the fourth and last segments are most prominent. There are also some thicker and larger processes in the middle of the first, fourth, fifth, and seventh segments dorsally; some tubercles at each side of the wing pads; two large processes placed near together on the metanotum, and less prominent ones at each side of thorax. The head carries three strong spines in front and two large strongly curved horn-like processes at base, which are conspicuously roughened. The processes at lateral margins of abdomen are yellowish-white towards the end, a little thickened and rounded at tip, with a few pores and short bristles; the others are dark brownish. Head brown. The thorax shows some dark patches; the lateral margins yellowish-white, nearly transparent; the wing pads, which extend to the fifth abdominal segment, are entirely translucent except for a blackish streak at base. Dorsal part of abdomen more or less speckled with reddish and brown.

* *Biologia Centrali-Americanica, Insecta, Rhynchota*, Vol. II, p. 47, 1897-1900.

Leptobyrsa explanata, n. sp.

Body short, oval in the female, more elongate in the male, shining black; membranous parts of pronotum and integument of elytra pale yellowish, semitranslucent, nervures yellowish. Head rather small, black, with three white frontal spines, two approaching each other, the middle one comparatively stouter; besides, there are two other more slender spines extending from behind the eyes towards front. Antennæ long, finely pilose, yellowish, the tips infuscated; two basal joints slightly thicker than the following ones, first joint twice the length of second, third little more than three times as long as fourth. Bucculæ yellowish, narrow, angulate and broader behind, the edge upturned a little. Pronotum transverse, feebly convex, coarsely punctured, and shining black; in fresh specimens the sides of pronotum are covered with a whitish film that also extends toward the underside at the sternum. Hood not much inflated, cristate and slightly tapering towards front; covering the head, except the eyes, with quite large areoles at the sides near top and a few smaller ones at lower part. The three pronotal carinæ yellowish, the median one strongly foliaceous, as high as crest of hood, rounded on top and slowly declining towards apex of the triangular posterior portion of pronotum, with a row of long, large areoles of which the middle ones are divided by a few cross nervures and embrowned; outer carinæ very low, only half as long as the median carina, extending from base of hood to sides of pronotal portion posteriorly; the triangular part of pronotum rather short, yellowish and finely reticulated; membranous pronotal margins strongly rounded behind, reflexed, widening moderately at sides, narrowing toward the neck and reaching the lower part of hood close to the eyes, with two or three rows of average-sized areoles. Elytra ovate, iridescent, extending one-half their length beyond abdomen, a little less in the male; strongly rounded from base to apex, broadest behind the middle; discoidal area pyriform and short, angularly raised at the outer nervure, somewhat rounded at apex and broadly scooped out on the upper surface, with three or four rows of quite large areoles at the widest part. Subcostal area subvertical, wider than the discoidal area, having about five rows of irregular small areoles, those of the upper row much larger; costal area broadly expanded, with four or five rows of very large, more or less irregular areoles, diminishing to three and two rows at base. Surface of elytra very peculiarly undulated, with two transverse, sharp impressions, and another at apex formed by the outer nervure of subcostal area; a light transverse fascia on basal half. Median nervure of subcostal area strongly sinuate towards tip of elytra; sutural area at inner part irregularly reticulated with rows of some extremely large areoles. Entire margin of elytra, lateral margins of pronotum, crest of hood, carinæ, and most of the nervures beset closely with long, very fine hairs. Rostral groove un-

interrupted, broad at mesosternum and metasternum, angularly closed in front; rostrum reaching metasternum. Abdomen of female broadly rounded at apex, in the male more elongate, the sides of genital segment sinuated; at tip two strong claspers. Length, 3.6 mm.; width of each elytron across widest part, 1.4 mm.

Described from several specimens, male and female, Washington, D. C., June 23, 1890; Highlands, N. C., September 15, 1906 (R. S. Woglum); Sugarloaf Mountain, Md., October 8, 1902 (O. Heidemann); Greensburg, Pa. (F. C. Pratt); Sea Cliff, L. I., New York, June (N. Banks); Berkeley Springs, W. Va.; Dellsow, W. Va., (A. D. Hopkins); Bedford Co., Pa., August 12, 1904; Kovona, N. C. July 29, 1899 (E. D. Sanderson); Portage, Pa., (Wirtner); Lehigh Gap, Pa., July 1, 1877 (Uhler's Coll.); Aurora, W. Va., August 12, 1904; Warren, Ohio, July 15, 1897 (H. B. Perkins); Black Mts., N. C., June 24 (Wm. Beutenmüller).

Type (from Rock Creek, D. C., July 6, 1897, female and male).—No. 9909, U. S. National Museum.

This new species seems to be most correctly placed in the genus *Leptobyrsa*^a, which was founded by Stål on a single species^b from Rio Janeiro, Brazil. It agrees very well with the diagnosis he has given of his genus. It also has much affinity with the genus *Stephanitis* Stål, but the hood is comparatively smaller and the lateral carinæ extend over the whole length of pronotum, not abbreviated in front. Dr. C. Berg^c recorded another species from Argentina, South America, and Dr. G. C. Champion^d described several new species from Central America. Our species resembles two species, *Leptobyrsa steinii* Stål and *Leptobyrsa translucida* Champion; from the first it differs in having the membranous margins of pronotum less advanced in front, the sides not straight but evenly rounded, and from the latter it can be distinguished by the more prominent hood, also in having two sharp impressions across the elytra.

This tingitid lives quite abundantly on the mountain laurel (*Kalmia latifolia*) and on *Rhododendron maximum*. It has been found up to the present time on the Atlantic side from Florida as far north as Boston, Mass., and westward to Ohio. The insect is recorded as injuring *Rhododendron* foliage.

^a *Leptobyrsa* Stål, *Enumeratio Hemipterorum*, III, p. 119 (1873).

^b Stål, *Tingis stenii*, *Hemipter-fauna Rio Janeiro* (1858) (K. Vet. Akad. Handb., B. 2, No. 7).

^c C. Berg, *Hemiptera Argentina*, p. 137 (1879).

^d Champion, *Biologia Centrali-Americanana*, II, pp. 25-27 (1897-1901).

The eggs are laid late in the fall, very differently from those of all the other tingitid species with which I am acquainted. Instead of being fastened on the surface of the leaves, unprotected, as are those of the species living on oak, or being hidden beneath the pubescence of the leaf like those of the sycamore species, they are inserted entirely into the epidermis of the leaves, mostly at the sides of the main rib. In this enclosure the eggs are protected during winter, and the leaves of the laurel do not wither and fall off in this region before the middle of June. Late in March, or in the earlier part of April when the embryo insect in the egg begins to grow, there appear on the underside of the leaf, right on the midrib, some brownish spots. Later these spots show little cracks, and thereby the tip of the egg is exposed; soon the lid of the egg, which is somewhat oval in shape, is thrust open and the young larva emerges from its confinement. The egg is of a cylindrical-oval form, yellowish-white in color, and about 0.4 mm. long.

The young brood and some unhatched eggs were found on leaves of *Kalmia latifolia* in the woods near Brightwood, D. C., April 20, 1903. Some of the infested leaves of mountain laurel were taken home and placed in glass jars so that the hatching of the eggs and the development of the larval forms might be studied. After three days some of the eggs opened and the young larvæ appeared; they are of a whitish color, somewhat transparent at first, and without spines. After taking plenty of nutrition the color turns into a greenish white; the body is more elongate, and the head comparatively very large; the antennæ are long, nearly reaching end of abdomen, thick, and beset with fine hairs.

Four days later the young nymphs shed their skins and entered into the second stage of development. This time the color darkens on the thorax and middle of abdomen; the form of the body has changed and become broader; the eyes are large, showing five red facets; at sides of each abdominal segment small processes protrude, also a few prominent ones on the first, third, fourth, and sixth segments at middle of abdomen dorsally; others, still more prominent and stouter, on the pronotum and mesonotum and five on the head, those at base of head largest and bent forward; in this stage the antennæ and head appear smaller and less stout than in the former stage.

The larvæ began shedding the skin again on the 3d of May, but any further observations on the other stages of development came to a sudden stop; the insects died or dis-

appeared in spite of new and fresh food. The last stage of development of the nymph was examined at another time and is described below:

Description of last stage nymph.—Body elongate-elliptical, yellowish-white, pellucid, some brownish spots on inner side of the wing pads basally and at apex; abdominal segments on the middle and all the appendages or processes toward the tip brownish. Pronotum transverse, lateral margins rounded; hood, median carina, and triangular posterior part of pronotum already indicated. Antennæ as long as the whole body, finely pilose, yellowish, tip of the two terminal joints brownish. Wing pads reaching the third abdominal segment. Head with five long processes, of which two at base of head are most prominent and bent forward; two smaller ones on a little elevation of median carina near together; very large processes on each lateral margin of pronotum; two on the mesonotum and a single one at middle of the first, third, fourth, and sixth dorsal segments of abdomen; another on each wing pad; the processes on the lateral margins of abdomen are slightly smaller. These appendages or processes are peculiarly shaped, cylindrical, narrowing toward the apex, the edge of tip armed with two or three small sharp teeth; there are also some pores and short bristles on the surface of these processes visible by high power magnification. Length, 2 mm.

In naming this species I gladly adopt the manuscript name of Professor Uhler.

EXPLANATION OF PLATE IV.—*a*, *Acysta perseæ*, adult; *b*, nymph of same; *c*, lateral abdominal process of same; *d*, *Leptobyrsa explanata*, adult; *e*, nymph of same; *f*, lateral abdominal process of same.

MAY 7, 1908.

The 222d regular meeting was held at the Saengerbund Hall, 314 C Street, N. W. President Hopkins presided, and there were present Messrs. Barber, Burke, Davis, Dyar, Ely, Gahan, Heidemann, Hopkins, Kraus, Marsh, Patten, Piper, Quaintance, Sanders, Schwarz, Ulke, Van Horn, and Webb, members, and Messrs. Elsey and Bailey Willis, visitors.

—Mr. Sanders exhibited mounted specimens of the chalcidid species *Syntomaspis druparum* Boh. and *Megastigmus collaris* Boh. The larvæ of *Syntomaspis* was found in November, 1907, in the seeds of a hybrid (Pear \times *Crataegus*) introduced from Christiania, Norway, by the Bureau of Plant Industry. The adults were reared May 2, 1908. The species was de-

scribed as *Torymus druparum* Boh. from specimens reared from the mountain ash (*Sorbus scandica*). It has been reported from Sweden, Germany, Crimea, and New York State.

The *Megastigmus* specimens were reared on May 1, 1908, from seeds of *Rosa* sp. sent from Peking, China, by Mr. F. N. Meyer, agricultural explorer for the Bureau of Plant Industry. The infested seeds were easily selected by their brownish color. The species was originally described by Boheman as presumably parasitic on *Trypeta continua* Meig. in rose fruits from Saxony.

—Mr. Sanders also exhibited specimens of the coccid *Capulinia sallei* Sign., on *Eugenia tuberculata*, from Santiago de las Vegas, Cuba. These were collected by Mr. Wm. T. Horne and are particularly interesting because of the cob-web-like waxy exudations. A very minute coccinellid, which was determined by Mr. Schwarz as a new species of *Scymnillus*, was reared from a large lot of specimens but no hymenopterous parasites were obtained.

—Doctor Hopkins called attention to the record of the destruction of Douglas spruce seeds by *Megastigmus pinus* Parfitt and referred to his observations on *Bruchophagus funebris* How., where a supposed hymenopterous parasite was discovered to be an enemy of clover seed and not of a *Bruchus* or any other insect living in the seed.

—In answer to a question by Professor Quaintance about the sorghum seed crop, Professor Piper said that the cecidomyiid *Diplosis sorghicola* Coq. destroyed the entire seed crop of sorghum south of a certain definite line in Texas. This was proved by bagging the heads at an early stage. When the insects were eliminated in this manner, full heads of seed were grown.

—The question by Mr. Willis as to what determines the habitat of a species led to a spirited discussion. Mr. Willis said the commonly accepted idea was that the temperature at breeding time was the determining factor. Mr. Schwarz said he doubted this and he did not believe that the cause or causes that determine the range of species were known. Temperature is probably only one of the many factors. Doctor Hopkins

thought that there were two primary factors in the distribution of a species—one, climate, the other, food. But while as a general principle this appears to apply, there is sometimes a great difference between species as affected by one or the other. He stated that in his study of the Scolytidæ and other forest insects he found that some species of a genus may be restricted to a given faunal zone regardless of the natural or artificial distribution of the host, while others will be distributed over several widely different zones of a continent and become adapted to many hosts. Professor Piper said that sometimes one factor determines and sometimes another. That temperature is not always the prime factor was well illustrated by an observation on two species of spermophiles in Washington State. The two species had definite ranges. When a disease nearly exterminated one the other occupied the abandoned range, proving that competition between the species was a strong factor in determining their habitat.

—Mr. Heidemann exhibited specimens of *Teraticoris herbaricus*, a capsid described by Uhler from Labrador, and referred to a lately published paper in Swedish by Prof. O. M. Reuter, "A North American Hemipter found in Norway," in which it is stated that specimens found in Tromsoe, northern Norway, proved to be in every detail identical with the species from Labrador. It has nowhere else been found in the Palæarctic region and the probability is that the North American species was distributed over Greenland and Iceland into Norway.

Doctor Hopkins stated that his observations on the Scolytidæ led him to believe that many so-called circumpolar species are distinct and that often the supposed affinities are more apparent than real, being due to the parallel development of characters under similar environments. He stated further that it was not impossible or even improbable that many forms of life, common to two or more countries, which are recognized as species, may have had independent origin from a common primitive stock.

—Mr. Van Horn exhibited adult specimens of the elaterid beetle *Microrrhagus pectinatus* Lec. and some interesting larvæ which may prove to be its immature stages. The larvæ

are remarkable because of their peculiar mouthparts, which are so fused as to be almost indistinguishable. They bore in the decaying wood of oak, sycamore, and yellow poplar. Some photographs, taken by Mr. Barber, of the larvæ, were also exhibited.

—Mr. Webster reported the finding of the clover root-borer (*Hylastinus obscurus* Marsham) on the Pacific Coast, Mr. Geo. I. Reeves having recently sent it from Vancouver, Wash., where it was seriously injuring red clover.

—Mr. Webster also reported the finding by Mr. Ainslie of both males and egg-laying females of the spring grain-aphis (*Toxoptera graminum* Rond.) in April of the present year. The material from which the insects probably originated was sent by Mr. E. O. G. Kelly from Leavenworth, Kans., late in February; the insects were kept on wheat in the office and continued to give birth to their young as usual. Some time late in April Mr. Ainslie, on looking over the breeding jars, came across eggs stuck on the inside of the glass with which the infested wheat was covered. Almost immediately after, he found the male and sexual female, some of the latter containing both eggs and embryos within their abdomens. The finding of the sexes in spring—and the males continue to appear up to date, May 6—is without a precedent, so far as he was able to learn. These forms always occur in the fall, and their presence, as here shown, indicates that they may thus occur in the fields in spring in the far South.

—The following papers were presented for publication:

TWO NEW STENOMID MOTHS FROM THE EASTERN UNITED STATES.

By AUGUST BUSCK.

Brachyloma decorosella, n. sp.

Labial palpi brownish ochreous; tip of second joint and base of terminal joint whitish. Face, head, and tongue whitish ochreous. Antennæ light brown, as in the following species ciliated in the male (1); simple in the female. Thorax light brown. Fore wings rich deer brown, with a strong silky lustre; the entire costal edge narrowly

light ochreous; at the end of the cell a barely perceptible darker brown spot. Hind wings whitish fuscous; cilia ochreous. Abdomen and legs whitish ochreous.

Alar expanse, 22-24 mm.

Montclair, N. J. (W. D. Kearfott); Tryon, N. C. (W. F. Fiske).

Type.—No. 11945, U. S. National Museum. Co-types in Kearfott collection and Museum Walsingham.

Closely related to the following species and to *B. unipunctella* Clemens, but at once distinguished by the darker rich brown color and the light costal edge.

Brachyloma quericiella, n. sp.

Labial palpi whitish; second joint shaded with light fuscous exteriorly. Face whitish. Thorax dark gray. Fore wings light ochreous gray with a very strong lustre; the fold slightly darker; at the end of the cell are two blackish dots one above and somewhat nearer the base of the wing than the other. Hind wings whitish fuscous. Abdomen ochreous fuscous, anal tuft whitish. Legs whitish, front legs dark fuscous anteriorly.

Alar expanse, 22-24 mm.

Hazleton, Pa. (W. G. Dietz); Montclair, N. J. (W. D. Kearfott); Sulphur Springs, Pa. (O. Heidemann).

Foodplant.—*Quercus* (Dietz, Kearfott).

Type.—No. 11946, U. S. National Museum. Co-types in Kearfott collection and Museum Walsingham.

Similar in size and wing form to the foregoing species, but very distinct in coloration.

DESCRIPTIONS OF ELEVEN NEW NORTH AMERICAN PYRALIDÆ, WITH NOTES ON A FEW OTHERS.*

[Lepidoptera.]

By HARRISON G. DYAR.

Subfamily NYMPHULINÆ.

Elophila daemonalis, n. sp.

Grayish white, the ground color largely overlaid by the markings; markings resting on the costal edge of fore wing brown, consisting of a large wedge-shaped mark near the base, beyond which the inner line

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crosses the wing, straight, white; a small mark on costa beyond; two wedge-shaped spots subapically, converging below, separating three white dashes, the brown marks fading to yellow below; a broad yellow terminal band, joining at tornus an oblique wedge-shaped mark from the end of the cell; four erect yellow bars on inner margin, the outer cutting the mark from the cell and enclosing a metallic silvery patch above tornus, the second one small, the other two reaching the cell; subterminal white line silvery below. Hind wing with a short broad yellow bar in the disk, preceded and followed by silver scales, the area between the outer silver patch and the margin to apex again yellow; four or five illly separated black spots on the margin, separated by silvery metallic scales and preceded by partly confluent black arcs. Expanse, 14 to 16 mm.

Thirteen specimens, Devil's River, Tex., May 5 and 6, 1907
(Bishopp & Pratt).

Type.—No. 11845, U. S. National Museum.

At first sight this looks like *E. fulicalis* Clem., except for its pale yellowish color, but the markings of the hind wings are different.

Subfamily CRAMBINÆ.

Dicymolomia opuntialis, n. sp.

Silvery gray; head, thorax, and second joint of abdomen shaded with orange-fulvous. Wings silvery gray; fore wing with the base fulvous-orange, followed by a broad straight band of this color; a faint wavy narrow black line with an orange blotch on costa; a small black discal mark; a fine black outer line excurred over cell, angled on submedian, with an orange blotch on costa; a shaded orange submarginal band; a curved white costal subapical bar; followed by orange; fringe dark gray; hind wing with five black dumb-bell-shaped marginal spots, separated by metallic scales and shaded with dull orange within, the rest of the wing irrorate with black, silvery gray. Expanse, 13 mm.

One female, San Diego, Cal., issued September 8, 1905.

Type.—No. 9780, U. S. National Museum.

Subfamily PHYCITINÆ.

Ephestiodes mignonella, n. sp.

Light gray. The fore wing has a black stripe on the costa at base; inner line well removed from the base, white, edged with black without, especially on costal half, nearly erect, slightly indented on submedian fold; discal dots black, joined; outer line black within, white without, oblique, rigid, with a slight outward point at median vein; in several of the specimens a subbasal black dash on median vein;

fringe gray, with a black line at the base in the middle of the margin. Hind wing whitish, fuscous tinged outwardly, subpellucid. Expanse, 13 mm.

Five specimens, Kerrville, Tex., April 11, 12, 13, 1907 (F. C. Pratt).

Type.—No. 11848, U. S. National Museum.

Lighter colored than the other species of the genus and with more contrasted markings, but similar in pattern.

Zophodia bidentella, n. sp.

Fore wing gray, black scales on a pale ashen ground, uniform, the inner margin broadly, faintly luteous shaded; inner line black, slender, indistinctly geminate, dentate, a sharp tooth on discal fold and on median vein; discal dots approximate, not confluent; outer line rather near the margin, black, slender, irregularly dentate, followed by a white line and a dark gray shade that nearly fills the terminal space; a row of terminal black dots. Hind wing whitish, with a terminal fuscous line, the apex slightly tipped with fuscous. Expanse, 20 mm.

Four specimens, San Antonio, Tex., July, 1899 (O. C. Poling); Brownsville, Tex., June (F. H. Snow).

Type.—No. 11850, U. S. National Museum.

Allied to *glaucatella* Hulst, *polingella* Dyar, and *dilatifasciella* Ragonot, but distinguished by the dentations of the inner line.

Salebria robustella, n. sp.

Body stout, fore wing comparatively broad. Gray, the segments of the abdomen tipped with ocherous, darker shaded at the sides at base. Fore wing light gray, luteous-olivaceous shaded along the inner half; costal half of basal space whitish, the space crossed by an oblique blackish shade; inner line whitish, slightly oblique, narrow, ill-defined, followed by a blackish shade that fills the cell to the discal dot, which is single, blackish; outer line whitish, obscure, slender, dentate, incised on submedian and discal folds, preceded and followed by a blackish shade, the outer shade extending to the margin; a terminal row of faint dark dots; fringe with a dark basal line. Hind wing fuscous, darkest on the veins and marginal line, the fringe interlined with dark at the base. Expanse, 16 mm.

One male, Burnet Co., Tex. (F. G. Schaupp), from Mr. Kearfott.

Type.—No. 11849, U. S. National Museum.

Nearest to *georgiella* Hulst of any of the described species, but not much like even that.

Salebria ademptandella, n. sp.

Fore wing light gray, peppered with black; lines black, strongly relieved, the inner angled on subcostal and median veins, oblique and

doubled below vein 1; discal dots black, rather large, conjoined; a pulverulent strigose black mark below the discal dots on submedian fold; outer line black, geminate, whitish-filled, like the inner line, bent inward opposite the cell, indented on submedian fold; a row of connected terminal dots. Hind wing pale fuscous, the fringe whitish, lustrous. *Expanse*, 17 mm.

Two males, Kerrville, Tex., May and June, 1906 (H. Lacy).
Type.—No. 11705, U. S. National Museum.

Allied to *S. annulosella* Rag., *nubiferella* Rag., *turpidella* Rag., and *tenebrosella* Hulst, but of a brighter gray than all these, with markings prettily contrasted.

***Salebria rectistrigella*, n. sp.**

Fore wing dark, blackish gray; basal space filled in with blackish except a white shade on costa inward from the inner line and an obscure red-brown spot near the line below; inner line straight, a little oblique, white, distinct, a dark wedge on the costa beyond it; discal dots black, separate, the upper one relieved in a white cloud that rests on costa; outer line whitish, obscure, excurved mesially. Hind wing whitish, narrowly fuscous along the costa and outer margin; fringe pale. *Expanse*, 18 mm.

One male, Kerrville, Tex., June, 1906 (H. Lacy).

Type.—No. 11706, U. S. National Museum.

A distinct species, that at first sight looks like *Mineola amplexella* Ragonot.

***Euzophera placidella*, n. sp.**

Pale gray, the body ocherous tinted. Fore wing whitish gray on the costal half, nearly white on the costa, more irrorated with dark scales below, the inner half shaded with ocherous gray; inner line black, rather broad, erect, slightly curved, cut off before attaining the costa; a single black discal spot, outer line oblique, close to the margin and parallel to it except below vein 2, where it curves and becomes perpendicular to inner margin, black with an outer white border and a small black speck before apex. Hind wing whitish, grayish tinted, subpellucid. *Expanse*, 18 mm.

One male, Yuma County, Arizona, Colorado Desert; from Mr. Kearnott, I think, though this label has not been attached.

Type.—No. 11847, U. S. National Museum.

Entirely unlike any American species in the genus, looking rather like a species of *Honora*. The smooth labial palpi with long third joint and the long cell of the hind wings compel the present reference.

Subfamily ANERASTIINÆ.

Bandera binotella Zeller.

My specimens agree with Zeller's description better than with Ragonot's figure. There is present in all a gray powdery shading on the fore wings, leaving the ocherous ground-color showing clearly only in two streaks on either side of vein 1. By Ragonot's figure and description the wings should be entirely ocherous except for the costal markings and dots. Whether Ragonot's specimens were in poor condition or whether another species is involved may be left for later decision.

Brownsville, Tex., May 21, 1904, and June 9, 1904 (H. S. Barber); Five Mile Beach, N. J., July 2 (F. Haimbach).

Bandera cupidinella Hulst.

My specimens of this species, when in good condition, appear to have a white costal stripe owing to the width of the white lining on the subcostal vein; a lens shows that it does not reach the base except on the vein. It does reach the costal margin on outer half of the wing, and in this respect my specimens do not agree with the descriptions of Hulst and Ragonot, or the figure of the latter. As these authors appear to have had but a single specimen, in which the markings may not have been clearly apparent, I am inclined to retain the identification of my specimens.

Twenty specimens are before me from Colorado from the prairie at the foot of the Rocky Mountains, Denver and Fort Collins. I have seen many more, now in the collections of Doctor Barnes and Professor Gillette.

Bandera virginella, n. sp.

Allied to *cupidinella*, with the same pattern of markings and venation. It is smaller and whiter, the white of the veins spreading out, so that the ocherous color shows only along submedian fold; the costa is broadly white to base with a somewhat silvery sheen; rubbed specimens look entirely silvery white like a miniature *Crambus perellus*. One specimen has a blackish dot on vein 1 at basal third, a small one near the end of this vein, and a slight aggregation of scales above on vein 2.

Six specimens, Pullman, Wash., July 8, 24, 31, August 3, 6, 10, 1898 (C. V. Piper). One specimen bears the number 463 of the Washington Experiment Station in red ink.

Type.—No. 11851, U. S. National Museum.

The specimen with the dots suggests *binotella* Zell., but it

has not the venation of that species, veins 3 and 4 of fore wings being well separated as in *cupidinella* Hulst.

Pectinigera (Cayuga) pamponerella, n. sp.

Palpi long, porrect, perfectly straight, the second joint convex above. Pale ocherous, shaded with vinous. Fore wing with the costa broadly and evenly white, vinous shaded, the rest of the wing of the ocherous color; a fine black line along subcostal vein and vein 6 in one specimen followed by a faint blackish shading over the cell, the other specimen without the black line and the shading fainter. Hind wing faintly fuscous tinted in the dark specimen, whitish ocherous in the other. Expanse, 27 mm.

Two males, Chimney Gulch, Golden, Colo., August 12, 1907 (E. J. Oslar), from Mr. F. Haimbach, who has kindly permitted me to keep one type for the National Museum.

Type.—No. 11854, U. S. National Museum.

Similar to *P. (C.) gemmatella* Hulst, but the costal stripe reaches the apex of the wing instead of terminating before it, and the color is not so red.

Ollia holoponerella, n. sp.

Palpi long, porrect, gently and regularly downcurved. Ocherous, the palpi grayish tinted on the outside. Fore wing yellowish ocherous, with a few gray scales toward the outer margin, the costa broadly and straightly white with a fine black line along the subcostal vein. Hind wings whitish stramineous. Expanse, 27 mm.

One male, San Bernardino Ranch, Cochise Co., Arizona, 3750 ft., August (F. H. Snow).

Type.—No. 11855, U. S. National Museum.

This pattern of coloration is extremely common in the sub-family, but most of the species so marked are smaller. The size is the same as in the foregoing, *Pectinigera pamponerella*, and I at first thought it to be the same species. However, there is no tuft of scales discernible on the antennæ, the palpi are distinctly downcurved, the serrations of the antennæ are pointed teeth instead of quadrate plates (as in *pamponerella*), while the color is ocherous, without any red tint.

Pectinigera (Cayuga) bistriatella Hulst.

Ragonot makes this a synonym to *gemmatella* Hulst, and Doctor Hulst records it as a variety of the same in Bulletin 52, U. S. National Museum, presumably out of deference to Ragonot's opinion; but it is clearly distinct. I have no present notes of the type, but from the description it must be closely similar to *Peoria discostrigella* Dyar. In fact I have but little

doubt that I have redescribed Doctor Hulst's species, the difference in generic reference being due to instabilities in the venation. In my type, veins 4 and 5 are coincident on one side, very long stalked on the other, but in additional specimens the stalk of these veins is occasionally even rather short, varying on the two sides of the same specimen. My species was described in these PROCEEDINGS (Vol. vi, p. 115, 1904) and the variation in venation was noted, but I did not think to compare with *bistriatella*, as that name was buried under *gemmatella*, which it really does not resemble at all. The types of *discostrigella* are females, so the antennal structure can not be compared.

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TABLE OF CONTENTS OF THESE NUMBERS.

	PAGE.
AINSLIE, C. N.: <i>Tetrastichus</i> as a parasite on <i>Polygnotus</i> , 14; Note on the occurrence of <i>Campylomyza scutellata</i> Say, 16; Tenacity of life in <i>Evania urbana</i> Bradley.....	17
BANKS, NATHAN: On the classification of the <i>Corydalinæ</i> , with description of a new species, 27; A new <i>Tetranychus</i>	36
BUSCK, AUGUST: Two new stenomid moths from the Eastern United States	III
CHITTENDEN, F. H.: New species of <i>Balaninus</i> , with notes.....	19
COCKERELL, T. D. A.: A deceptive bee, 66; Three new bees of the genus <i>Nomada</i>	83
DYAR, HARRISON G.: Notes on a few apparent cases of synonymy in <i>Lepidoptera</i> , 30; Notes on the species of <i>Acrobasis</i> , with descriptions of new ones, 41; Notes on some American <i>Cochlidiidæ</i> , with descriptions of new species, 48; Descriptions of some new moths from Southern California, 52; A further note on the sloth moth, 81; A new <i>Saturnian</i> moth from the Southwest, 82; A review of the North American <i>Chrysauginae</i> , 92; A review of the North American <i>Pyralinæ</i> , 96; Descriptions of eleven new North American <i>Pyralidæ</i> , with notes on a few others.....	112
GROSSBECK, JOHN A.: Additions to the list of North American <i>Geometridæ</i> , with notes on some described species.....	85
HEIDEMANN, OTTO: Two new species of North American <i>Tingitidæ</i> . 103	
HOOKER, W. A.: Injury to oak forests in Texas by <i>Heterocampa manteo</i> Doubleday, 8; An observation on <i>Agapostemon melliventris</i> Cresson	9
HOWARD, L. O.: On two new species of parasites of <i>Aleyrodidæ</i> , 63; A new genus and species of <i>Mymaridæ</i>	68
JENNINGS, ALLAN H.: Mosquitoes destroyed by the nighthawk....	61
KNAB, FREDERICK: Swarming of a <i>reduviid</i> , 7; The early stages of <i>Sayomyia punctipennis</i> Say.....	36
KRAUS, E. J.: New bicolored <i>Ciodidæ</i>	74
PHILLIPS, W. J.: Notes on <i>Toxoptera graminum</i> and parthenogenesis of one of its parasites.....	II
WEBSTER, F. M.: Note on <i>Adistemia watsoni</i> Woll.....	3

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PROCEEDINGS
OF THE
ENTOMOLOGICAL SOCIETY
OF WASHINGTON

VOL. X SEPTEMBER-DECEMBER, 1908 Nos. 3-4

JUNE 4, 1908.

The 223d regular meeting was held at the Saengerbund Hall, 314 C street, N. W. President Hopkins presided, and there were present Messrs. Ainslie, Barber, Burke, Crawford, Davis, Dyar, Ely, Hall, Heidemann, Hopkins, Howard, Jones, Knab, Marsh, Patten, Quaintance, Sanders, Sasscer, Schwarz, Ulke, Van Horn, and Webb, members, and Messrs. Shonts, Smyth, and Snodgrass, visitors.

—Doctor Howard presented a paper entitled "Some Notes of Interest,"* in which he discussed, (1) the finding of tick parasites, (2) the introduction of a parasite of the elm leaf-beetle, and (3) an explanation of a fly-paper experiment. Mr. Knab asked if the elm tree is ever killed by the elm leaf-beetle. Doctor Howard replied that in exceptional cases, where a drought followed the defoliation, the trees were killed.

—Mr. Webb exhibited a species of *Pogonocherus* occurring on *Pinus edulis* and *P. jeffreyi* in Arizona, which has since been described by Mr. Chas. Schaeffer as *Pogonocherus californicus*.

—Doctor Hopkins then read a paper entitled "Another Definition of Species." It provoked spirited discussion on the part of Messrs. Schwarz, Hopkins, Dyar, and Barber.

—After the meeting Mr. Barber exhibited living specimens,

*The matter embodied in this communication has been published elsewhere.—PUB. COM.

both males and females, of the beetle *Phengodes laticollis* Lec., which he had quite recently collected on Plummers Island, Maryland (near Washington, D. C.), and the members had not only an opportunity to admire the luminosity of the larviform females, but also to witness the mating of the sexes, which are so dissimilar in form, and the fierce combats of the males among themselves.

OCTOBER 1, 1908.

The 224th regular meeting was held at the Saengerbund Hall, 314 C street, N. W., the Society being entertained there by Mr. E. A. Schwarz. President Hopkins presided, and there were present Messrs. Banks, Barber, Burke, Caudell, Crawford, Currie, Ely, Hall, Heidemann, Hopkins, Jones, Knab, Marlatt, Patten, Quaintance, Sanders, Sasscer, Schwarz, Van Horn, Webb, and Webster, members, and Messrs. Hyslop, Jennings, Leister, Lloyd, McAtee, McMillan, Overton, Peairs, Russell, Smyth, and Wellman, visitors.

—Under the title "Some Present Deciduous-fruit Insect Problems," Mr. Quaintance spoke of a recent trip to the Pacific Coast to investigate pear-thrips conditions; and also of a trip to Orcas Island, Puget Sound, Washington, to investigate the so-called service-berry moth (*Argyresthia conjugella* Zeller).

Referring to the pear thrips, Mr. Quaintance stated that the so-called pear thrips (*Euthrips pyri* Daniel) first came to notice in the spring of 1904 in the Santa Clara Valley in California. Since its first appearance, its injuries have constantly increased, and it has now spread to the principal deciduous-fruit growing sections in the San Francisco Bay region. The losses brought about by the pear thrips the past year have been perhaps not less than half a million dollars.

The pear thrips was first investigated in 1904 by Mr. Dudley Moulton, at that time entomologist of Santa Clara County, and a fairly complete account of it was published in a bulletin from the office of the state commissioner of horticulture. The increased destructiveness of the thrips led

to provision by Congress for an investigation of the insect by the Bureau of Entomology of the U. S. Department of Agriculture, and Mr. Moulton, who in the meantime had been employed by the bureau, was assigned to the work, beginning July 1, 1907, with headquarters at San Jose, Cal.

The pear thrips attacks various deciduous fruits, as almond, apricot, peach, prune, cherry, pear, apple, etc. The life history is briefly as follows: Early in the spring, as in late February or early March, the adult thrips begin to make their appearance from the soil, at once attacking the opening buds or blossoms, and by their feeding soon cause these to blight, literally nipping the fruit crop in the bud. Oviposition occurs soon after emergence, the eggs being placed in soft tissues, especially in fruit and leaf stems or in the midribs. The young larvæ feed upon the tender tissues of the leaf or flower, requiring some three or four weeks to reach their full size. They then leave the plants and work their way below the soil from 3 to 4 or even 10 to 12 inches, depending upon whether this is hard or soft. In the soil the thrips larvæ construct small oblong cells where they remain the balance of the season. In late fall and early winter, transformation to the pupa stage occurs, from which the adults develop to appear above ground about the time fruit trees are beginning to bloom in the spring. There is thus but one generation each year, and the insect spends practically ten months in the ground.

The pear thrips has proved to be a very difficult insect to combat, and its practical control has not yet been determined. The Bureau of Entomology is carrying out extensive experiments and demonstrations in spraying in the infested territory and is also testing over large areas the possibility of destroying the larvæ or pupæ in the ground by cultivation or other methods of soil treatment. Of many sprays tested, a proprietary tobacco extract and a distillate emulsion have proved most efficient. Spraying must be directed largely against the larvæ feeding on the more exposed portions of the plant. Of the various fruits attacked, pears and prunes suffer most, from the fact that the thrips are out in large numbers just when the buds of these fruits are beginning to swell, and these

are promptly infested and destroyed, usually before the blossoms expand.

In regard to the service-berry moth (*Argyresthia conjugella* Zeller), Mr. Quaintance said he had no difficulty in finding larvæ of this species in considerable numbers in apples in orchards on Orcas Island. The larvæ at this time (late August) were mostly full grown and occurred in the blossom end of apples, feeding in a cavity there excavated, while many individuals had penetrated to the seeds, which had been more or less hollowed out. The larva very much resembles the lesser apple worm (*Enarmonia prunivora* Walsh) and might readily be mistaken for it. In one orchard examined, approximately 75 per cent of the fruit was infested. In others investigated farther back from the shore-line, and which had evidently been sprayed, the injury was much less.

Mr. Quaintance also called attention to a recent account of the service-berry moth by Professor Sven Lampa, and exhibited a translation of this paper which Mr. C. B. Hardenberg had kindly prepared for him. It was not thought that this service-berry moth would prove to be especially important in orchards regularly sprayed for the codling moth, since its habit of feeding within the calyx cavity in a way very similar to the codling moth would render effective arsenical treatments.

It was found, during the course of a day's examination of apple orchards in the Orcas Island region, that the codling moth had not yet reached that territory.

Attention was called to an investigation in progress, in northern Ohio, of two barkbeetles, *Scolytus rugulosus* Ratz. and *Phlaeotribus liminaris* Harris, which have become unusually abundant, infesting principally the peach, but also attacking other deciduous fruit trees. This work was undertaken in cooperation with the Ohio agricultural experiment station, and Mr. H. F. Wilson, working for the Bureau of Entomology, spent the entire season in the field, with headquarters at Lakeside, Ohio. Considerable time was being devoted by Mr. Wilson to life-history studies of the two species, and extensive tests of various tree washes and other remedial operations were in progress. Photographs were shown of an orchard

being dug out and destroyed on account of the injuries of these insects, and of the orchard in which the tests of washes were being made.

In the discussion which followed, Doctor Hopkins stated that it was remarkable that the attack of *Scolytus rugulosus* on healthy trees should be so extensive, since the normal habit of this barkbeetle is to infest trees weakened or dying from some other cause. Its abundance indicates that some favorable conditions for its abnormal increase have prevailed and that its destructive attack on the living trees is due to this fact. The continuation of the destructive attack depends on the continuation of the insect in excessive abundance, otherwise it could not overcome the resistance of the healthy tree. Therefore anything that will reduce its numbers to a point where it can not kill the trees will bring it under control.

Professor Webster said that many of the orchards in northern Ohio have been in a weakened condition for about eight years, due to bad treatment and neglect.

—Mr. Marlatt talked on "Irish Notes and Insects," and gave an interesting account of his vacation trip and travels in Ireland the past summer. He made special mention of the number of peat bogs, and described their appearance and method of formation. He also gave an account of the meeting of the British Association for the Advancement of Science, which he attended while in Dublin.

Mr. Schwarz said that the fauna of the peat bogs is quite peculiar, and named a number of European Coleoptera found exclusively in or around peat bogs. He said that very little had been done on the fauna of the peat bogs of America, and that this would be an excellent subject for study by some young entomologist.

Mr. Banks stated that many mites are peculiar to peat bogs. Prof. Halbert has described a considerable number of Hydrachnidæ from Ireland, and states that the water-mite fauna of the peat bogs is very large.

—An interesting account of a beetle which destroys stored plants of the "guayule" rubber (*Parthenium argentatum*) was given by Dr. Francis E. Lloyd. He said that when the plant

is stored the beetle soon attacks and riddles the stems, transforming them into a mass of dust-like borings. This does not destroy the rubber, but fills it so full of small fibres of wood, from which it can not be separated, that it is worthless. About 20 per cent is lost in this manner. The insect loses its economic importance, however, because it has been found impractical for other reasons to store the plant for any length of time.

In the discussion Doctor Hopkins stated that the beetle mentioned by Doctor Lloyd is evidently *Pityophthorus nigricans* Blandf., which has also been reported to the Bureau of Entomology by H. Pittier, who found it injuring the same plant at Correen, Coahuila, Mexico. The insect is of special interest because of its habit of attacking a plant of such commercial value, and on account of its being the largest representative of the division of the genus to which it belongs. The species of *Pityophthorus* fall into two divisions, which are distinguished by both morphologic and bionomic characters; those of one infest coniferous trees only, while those of the other, to which this species belongs, infest only the broad-leaved plants and trees. The rubber-plant beetle evidently attacks the plant after it is dead, or soon after it has been cut and, as has been shown by the specimens in the forest-insect collection of the Bureau of Entomology, may continue to breed in the same bark and wood for several years. It is evident that the prompt utilization of the plant for the manufacture of rubber within a few days after it is cut would prevent all losses from this source.

Mr. Schwarz called attention to the fact that the jalap (*Ipomoea purga*) of commerce is more valuable when it has been eaten by the jalap beetle (*Ernoporus [Coccotrypes] jalappa* Letz.), a scolytid. For some reason, its medicinal qualities are improved by being eaten by the beetle.

SPECIAL MEETING, OCTOBER 19, 1908.

A special meeting of the Society was held in room 6, Bureau of Entomology, U. S. Department of Agriculture, to take ap-

properite action on the death of William H. Ashmead, a prominent member and former president.

President Hopkins presided and there were present Messrs. Banks, Barber, Burgess, Burke, Caudell, Clemons, Coquillett, Crawford, Currie, Heidemann, Hopkins, Howard, Knab, Kraus, Marlatt, Quaintance, Russell, Sanders, Sasscer, Schwarz, Snodgrass, Strauss, Van Horn, and Webb.

Doctor Howard moved that the chair appoint a committee of three to draft the necessary resolutions. This was seconded by Mr. Schwarz and carried. Messrs. Howard, Schwarz, and Banks were appointed, and reported the following resolutions which were ordered to be sent to the family of the deceased and to be printed in the PROCEEDINGS of the Society:

WHEREAS, the Entomological Society of Washington has lost by death its former President, William Harris Ashmead, and

WHEREAS, Doctor Ashmead was one of the oldest members of the Society and had, by his extraordinary activity and genius in entomological investigations, especially of a systematic character, contributed very greatly to the interest of the meetings of the Society and to the importance of its publications, and

WHEREAS, his warm-hearted enthusiasm and his kindly helpful character had brought him to occupy a high place in the affections of all of the members of the Society, therefore,

Be it resolved, that in the death of Doctor Ashmead the Society has suffered a very great loss; that the field of systematic entomology has been deprived of one of its most prominent workers, and that the development of that branch of science not only in this country but throughout the world will be retarded by his untimely end. And

Be it further resolved, that the members of the Society who loved and admired him will always profit by the memory of his indefatigable energy and his untiring effort to bring order out of the chaos of described and undescribed forms.

Be it further resolved, that a committee be appointed to prepare a sketch of Doctor Ashmead's life (including bibliography) for publication in the PROCEEDINGS of this Society,

and that copies of these resolutions be sent, with an expression of sincere sympathy, to his family.

L. O. HOWARD,
E. A. SCHWARZ,
N. BANKS.

President Hopkins announced that he had appointed Doctor Howard and Messrs. Crawford and Banks a committee to prepare a biographical sketch of the late Dr. Wm. H. Ashmead, and a bibliography of his writings.

Extended remarks were made on the character and work of Doctor Ashmead by Doctor Howard and Messrs. Schwarz, Crawford, Coquillett, Currie, Banks, Hopkins, Caudell, and Marlatt. All testified to his indefatigable energy and enthusiasm, to the way in which he inspired young entomologists, and to the great value of his work.

WILLIAM HARRIS ASHMEAD.

William Harris Ashmead, assistant curator, Division of Insects, United States National Museum, one of the foremost American workers in systematic entomology, died in Washington, October 17, 1908, after a lingering illness. Although his death had been expected for some months, owing to the character of the malady that laid him low, it was none the less a great shock to his wide circle of friends among the scientific community of Washington and to the members of the Entomological Society of Washington, of which he had been president.

Doctor Ashmead was born in Philadelphia, September 19, 1855. He was the son of Captain Albert Ashmead and Elizabeth (Graham) Ashmead, and came of fine old colonial ancestry on both sides. He was educated in the private and public schools of Philadelphia, and early in life entered the publishing house of J. B. Lippincott Company, of that city. Some years later he went to Jacksonville, Fla., and with his brother established a printing house for the publication of agricultural

books and other matter. He founded an agricultural weekly, and a daily entitled *The Florida Dispatch*. He edited the scientific department of the weekly, devoting himself chiefly to the investigation of injurious insects. Through his interest in this field, which became very great, he gradually built up a large collection of insects, and, experiencing great difficulty in securing determinations, began the study of systematic entomology. From the very first he was a tremendous worker and produced results with astonishing rapidity. His contributions to the scientific journals began in 1879, and from that date until the time of his final collapse he produced a long series of contributions to science, comprising more than 250 titles and including many papers of great systematic value. In 1887 he received an appointment as special field entomologist to the Division of Entomology of the United States Department of Agriculture, for the investigation of certain Florida problems. In 1888 he was appointed entomologist to the State Agricultural College and Experiment Station at Lake City, Fla., and while holding that position published one of the very first bulletins produced by an entomologist of an agricultural experiment station under the Hatch Act. It was entitled "Notes on Various Injurious Insects." In 1889 he was made an assistant entomologist and investigator of the Division of Entomology of the United States Department of Agriculture. During the winter of 1890-91, on leave of absence, he went abroad and studied for several months in Berlin. On his return he continued his work under the Division of Entomology, and in 1895 was appointed assistant curator of the Division of Insects, United States National Museum, which position he held until a few months before his death. He donated his large private collection to the National Museum about 1898.

As a worker Doctor Ashmead was possessed of an enthusiasm and an industry that has rarely been equaled. For many years he allowed himself but five hours, or a little more, sleep, devoting the remainder of his time, with the exception of that needed for eating, to an incessant study of the forms in which he was for the time interested. The amount of work accomplished was thus enormous. Either of his two main works,

namely, his Monograph of the North America Proctotrypidæ, published as Bulletin 45 of the United States National Museum, a work covering some 500 pages, or his Classification of the Chalcid Flies or the Superfamily Chalcidoidea, published by the Carnegie Museum, Serial No. 21, a quarto volume of 335 pages, would have been enough to have monopolized the working part of the lifetime of any one ordinary man. But aside from these he left some manuscript for a great monograph of the Braconidæ.

Doctor Ashmead was given the degree of Master of Science by the Florida State Agricultural College, and in 1904 was made a Doctor of Philosophy by the Western University of Pennsylvania, the Monograph of the Chalcidoidea just mentioned having been submitted as his thesis. He was prominent in scientific circles. He was an honorary member of the Entomological Society of America, a fellow of the American Association for the Advancement of Science, and a corresponding member of the American Entomological Society, of Philadelphia. He had been president of the Entomological Society of Washington (1894-5), vice-president of the Biological Society of Washington, president of the Cambridge Entomological Society (1894), vice-president of the Washington Academy of Sciences (1888, 1893, 1894), honorary member of the Entomological Society of Ontario, and vice-president of the Association of Economic Entomologists (1892). He was a member of the Cosmos Club, of Washington, and of its very important committee on admissions. He married, in Philadelphia, in 1878, Harriet, the daughter of Thomas O. Holmes. He leaves a widow and one married daughter.

When he came to Washington, he was a man of large property, which, however, was greatly reduced by the disastrous Jacksonville fire. This, however, did not appear to prey upon his mind, and he remained, until the end, the same cheerful, tireless worker in the field of pure science.

Doctor Ashmead's entomological career may be considered under six headings: His early, mostly economic, work; his interest in Hemiptera and Coleoptera; the articles on the Cynipidæ; the descriptive papers on various groups of Hymen-

optera; the monograph of the Proctotrypidæ, and the classification of the superfamilies of Hymenoptera. His economic work is best exemplified in his "Orange Insects," in which he was a pioneer. In the Hemiptera he took great interest, much more than that indicated by the few papers thereon. He not only collected Hemiptera extensively, but exchanged with Europeans, amassed a considerable library, and had a manuscript catalogue to most of the groups. Even to within a few years of his death he had expected to again devote time to the Hemiptera. His interest in Coleoptera was chiefly with the Coccinellidæ, in which family he had described a new species during his economic work.

His work on Hymenoptera began with the study of galls. He collected them in Florida, a then unworked region, and described many new species. In rearing the Cynipidæ he also obtained many chalcidids. He thus became interested in all the micro-Hymenoptera, and these thereafter held first place in his studies. He described hundreds of new species in this new field, and after coming to Washington described in other families, always showing a partiality for the parasitic forms. Then followed his most valuable and finished work, the Monograph of the Proctotrypidæ. To this he devoted several years of close study, not only, as before, going into specific description, but into the generic characters, and into the general structure and morphology of the family. The completion of this great monograph gave him confidence in his powers of classification; a confidence that, overlooking all obstacles, pictured the finished work. Here in the Monograph of the Proctotrypidæ, for the first time, he had numerous illustrations of the insects, and thereafter in nearly all of his descriptive papers he endeavored to figure some of the forms.

His success in presenting the generic classification of the Proctotrypidæ doubtless led him to attempt the same for the other families. This last, and in many ways the most important work of his career, was scarcely finished at his death. The magnitude of this task never daunted him, the difficulties in obtaining literature and specimens never wearied him, but with the enthusiasm gained from the discovery of new struc-

tural characters he carried the generic classification of all of the superfamilies, excepting that of the ants, to completion. Perhaps the most striking one of the series is that on the Cynipoidea; but the one which made the greatest stir, was that on the Ichneumonoidea. The hundreds of genera of this group, scattered in a most discouraging way through all sorts of journals, the despair of the systematist, were now available to all in synoptic form. European Hymenopterists began to describe new genera and species from all parts of the world. To this paper was appended his synoptic table to all the families, 94 in number, that he recognized in the Hymenoptera. The largest of these classifications, and the one which Doctor Ashmead considered the most important, is that on the Chalcidoidea. These tiny insects had long been his favorites, and his arrangement of them will long serve as the basis for their study. To this paper was added a catalogue of the South American chalcidids, with descriptions of over 200 new species.

In the progress of these studies he made a number of important changes in the position of various families. His adoption of the superfamily idea enabled him to exhibit the family relationships to better advantage. He subordinated or abandoned the venational characters, and drew more heavily upon the structure of the body for main divisions. The families of the old "Fossores" were arranged in two superfamilies, several of them being united with the chrysidiids, eumenids, bethylids (formerly part of the Proctotrypidæ), and the vespids to make the superfamily Vespoidea. The other fossorial families, forming the superfamily Sphegoidea, were shown to have more affinity with the bees. The Proctotrypoidea were associated more closely with the Vespoidea than with the other micro-Hymenoptera, and the Braconidæ were united with the Ichneumonidæ to make the superfamily Ichneumonoidea.

These revolutionary changes in the old-time systems have naturally awakened much discussion, and the undoubted tendency is now to follow Ashmead, at least in most of his views.

As an appendix to his main lines of study we may place his descriptive work on the Philippine Hymenoptera. This came in during his work on the classification. He felt that the

accession of so much interesting material from such a little-known country needed attention, and he worked over each sending from these islands as soon as it was received.

Altogether he described about 3,100 new species, and 607 new genera.

All through his systematic work he never lost interest in the biological side of the subject, and one of his most entertaining articles is the summary of the habits of the aculeate Hymenoptera. "It was always with peculiar pleasure that he noted where the life-habits of a group supported his structural divisions.

Few were more interested in our Society than he. Rarely did he miss a meeting, and when present he always had something to say. He contributed a great number of papers, and his ardent and exultant manner in presenting "two new and remarkable genera" will never be forgotten. The details of their structure, their relation to other forms, their effect on the classification, were all explained to his admiring listeners.

Like so many indefatigable workers in science, Doctor Ashmead was most helpful to his fellow-workers. His knowledge and his time were always at the disposal of others, and he was noted for his attitude of encouragement towards younger investigators. He had the kindest of hearts, and will always be gratefully remembered by those who knew him.

THE ENTOMOLOGICAL WRITINGS OF WILLIAM
HARRIS ASHMEAD, WITH AN INDEX TO THE
NEW GENERA DESCRIBED BY HIM.

By J. C. CRAWFORD.

In the following bibliography, the numbers given to the papers are, with a very few exceptions, those assigned by Doctor Ashmead himself, the only changes made being those necessary to show priority. In the preparation of this bibliography the author has had access not only to a set of Doctor

Ashmead's papers, which was almost complete, but also to the notes kept by Doctor Ashmead. While the list of titles is complete so far as longer articles are concerned, and those describing new genera and species, there are still many unsigned notes on economic entomology published by Doctor Ashmead while living in Florida, and also many shorter communications and remarks published in the PROCEEDINGS of the Entomological Society of Washington.

Titles or parts of titles given in brackets are supplied; in cases where the complete title is supplied it indicates that the article was not published by Doctor Ashmead, but that it contains descriptions or tables furnished by him.

In the index to the new genera, the earliest publication found has been cited, irrespective of whether it has been given with a described species, a manuscript name, or without citing any type. In some instances it has been very difficult to find the first reference, since the genera were often published with no indication that they were new.

The first number after a genus in the index to the new genera is the number of the paper in which the genus is described, and the next, the page reference.

All genera belong to the Hymenoptera, except *Eurymeloides* and *Polydontoscelis*, which are Hemiptera.

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INDEX TO THE NEW GENERA.

Acanthægilips, 130: 67.
Acantheucoela, 214: 67.
Acanthometapon, 238: 314, 498.
Acanthopria, 117: 804.
Acanthoptenos, 145: 212.
Acanthormius, 259: 200.
Acanthoscelio, 88: 236.
Acanthosmioides, 162: 76.
Acothyreus, 41: 157.
Actenopoda, 193: 88.
Adelencyrtus, 172: 401.
Adeliopria, 197: 15.
Ænigmostomus, 176: 128.
Ælolothynnus, 213: 101.
Agathobanchus, 176: 97.
Agenioideus, 193: 85.
Agenioxenus, 196: 137.
Alliognathus, 165: 219.
Allocyphonyx, 196: 136.
Alloderma, 238: 273.
Allomutilla, 153: 57.
Alloneurion, 153: 59.
Allotheronia, 176: 55.
Alophomyia, 242: 126.
 n. n. for *Alophus Ashm.*
Alophus, 238: 353, 519.
 preocc. = *Alophomyia Ashm.*
Amauromorpha, 255: 410.
Ametallon, 238: 344, 511.
Amicopidae, 176: 118.
Ampulicomorpha, 88: 79.
Andreus, 219: 156.
Anodontomerus, 176: 61.
 n. n. for *Aplomerus Prov.*
Aomodyctium, 151: 309.
Aphidencyrtus, 172: 398.
Aphiloctenus, 193: 87.
Aphilodictium, 151: 310.
Aphobetoideus, 238: 328.
Aphrastobracon, 120: 646.
Apocryptophagus, 238: 238.
Aporinus, 193: 88.
Aporoideus, 193: 86.
Apterencyrtus, 249: 5.
Apterolelaps, 187: 312.
Apteromutilla, 232: 324.
Arachnophaga, 125: 18.
Arachnophila, 193: 86.
Arachnophroctonus, 193: 81.
Aradophagus, 88: 166.
Argogorytes, 169: 324.
Asclepiadiphila, 135: 263.
Athyreodon, 176: 87.
Aulacidea, 130: 68.
Aulocostethus, 196: 133.
Aulonotus, 182: 368.
 n. n. for *Holconotus Först.*
Aximogastra, 238: 261, 462.
Aximopsis, 238: 259, 460.
Banchogastra, 176: 87.
Baryproctus, 176: 139.
Bassettia, 41: 146.
Batozonus, 193: 81.
Belonura, 119: 224.
Blakeius, 232: 327.
Blatticida, 238: 305.
Bocchus, 88: 91.
Bothriomutilla, 153: 55.
Brachycaudonia, 238: 283.
Brachycranium, 182: 368.
 n. n. for *Brachycephalus Först.*
Brachycrepis, 55: 176.
 = *Bubekia D. T.*
Brachyscelidiphaga, 178: 343.
Brownius, 249: 7.
Bruchobius, 238: 314.
Bruchophagus, 50: 42.
Bruesia, 230: 306.
Cacellus, 221: 92.
 n. n. for *Cacus Riley.*
 = *Œthecoctonus Ashm.*
Cænonomada, 162: 68.
Callibracon, 176: 138.

Callicryptus, 176: 43.
Calliephialtes, 176: 54.
Callihormius, 176: 148.
Calliscelio, 88: 218.
Calopompilus, 173: 188.
Caloptilia, 145: 212.
Calozarca, 143: 129.
Canidiella, 182: 368.
 n. n. for *Canidia* Holmgren.
Cecidoxenus, 238: 274.
Cephalothynnus, 213: 100.
Cerambycobius, 125: 17.
Cerapteroceroides, 243: 156.
Ceratobæus, 88: 175.
Ceratogastra, 182: 368.
 n. n. for *Ceratosoma* Cresson.
Ceratoneura, 102: 178.
Ceratopria, 88: 428.
Ceratosmicra, 238: 251.
Chalcidiscelis, 156: 201.
Chasmias, 176: 17.
Chelonogastra, 176: 139.
Chestomorpha, 172: 370.
Chromocryptus, 176: 41.
Chromomicrodus, 176: 129.
Chromoteleia, 88: 219.
Chrysoatomus, 238: 342.
Chrysocarodes, 102: 177.
Chrysocaroideus, 238: 370.
Chrysoglyphe, 102: 160.
Chrysonotomyia, 238: 344.
Chrysoplatycerus, 61: 38.
 n. n. for *Rileya* Howard.
Chrysopophagus, 100: 245.
Cirrospiloideus, 238: 354.
Coccidencyrtus, 172: 383.
Coccophoconus, 172: 375.
Cockerellia, 149: 284.
Celocyba, 178: 344.
Ceolopelta, 88: 289.
Celothorax, 139: 165.
Compsobracon, 176: 138.
Compsocryptus, 176: 43.
Compsodryoxenus, 121: 128.
Coptereucoilà, 41: 151.

Crassimicrodus, 176: 128.
Cremastobæus, 88: 228.
Cressonianus, 176: 20.
Crocisaspida, 162: 68.
Cryptoideus, 176: 42.
Cryptopteryx, 176: 42.
Cryptuopsis, 176: 45.
Ctenopyga, 258: 29.
Curriea, 176: 137.
Cyaneoderes, 162: 70.

Dallatorrea, 195: 205.
Dasyglenes, 55: 174.
 = *Epistenia* Westwood, 156: 202.
Dasymutilla, 153: 57.
Decatomidea, 50: 42.
Decatomothorax, 238: 273.
Diadiasiella, 162: 64.
Diaulomorpha, 178: 347.
Diaulus, 238: 356.
Dicerataspis, 117: 744.
Dicelothorax, 157: 240.
Dieucoila, 212: 222.
Diglyphomorpha, 238: 352.
Dimicrostrophis, 36a: 172.
Dimmockia, 238: 357.
Dimorphomutilla, 232: 325.
Dimorphopteryx, 151: 308.
Dinomyrmex, 256: 384.
Dinoura, 178: 341.
Diolcogaster, 176: 132.
Diplodontia, 54: 87.
Dissolcus, 88: 164.
Disomphalus, 88: 41.
Dolichocrabro, 165: 216.
Dolichomutilla, 153: 55.
Dolichopselephus, 69: 23.
Dolichostrophus, 226: 151.
Doryctomorpha, 176: 144.
Dryorhizoxenus, 16: xxv.
 = *Belonocnema* Mayr, 33: 61.

Ecphoropsis, 182: 368.
 n. n. for *Ecphora* Först.
Ecphyloipsis, 176: 146.

Eisenia, 238: 233.
 preocc., = *Eiseniella* Ashm.
Eiseniella, 258: 31.
 n. n. for *Eisenia* Ashm.
Elachertomorpha, 238: 352, 518.
Elasmognathias, 258: 31.
 n. n. for *Elasmognathus* Ashm.
Elasmognathus, 265: 405.
 preocc., = *Elasmognathias* Ashm.
Embidobia, 115: 264.
Emphoropsis, 162: 60.
Encyrtaspis, 238: 290.
Encyrtoccephalus, 178: 334.
Endelomyia, 148: 256.
Endomychobius, 119: 227.
Enneasmicra, 238: 252, 449.
Ephutomma, 153: 52.
Ephutopsis, 234: 6.
Epicrossocerus, 165: 215.
Epiencyrtus, 172: 396.
Epimecoideus, 176: 52.
Epimelissodes, 162: 63.
Epimicrodus, 176: 129.
Epinæoideus, 238: 374.
Epinomia, 162: 88.
Epiphilanthus, 168: 294.
Epipteronalus, 238: 319.
Epirhyssalus, 176: 142.
Episigalpus, 176: 125.
Eriocampidea, 148: 256.
Eritrissomerus, 88: 298.
Erythraspides, 143: 128.
Erythropimpla, 176: 57.
Euceroptres, 119: 187.
Eucoilidea, 41: 154.
Eucorystoides, 182: 368.
 n. n. for *Eucorystes* Marshall.
Euctenopus, 176: 50.
Eudecatoma, 50: 42.
Eufroggattia, 242: 126.
 n. n. for *Froggattia* Ashm.
Eukoebelea, 242: 126.
 n. n. for *Koebelea* Ashm.
Eulophopteryx, 238: 341, 506.

Eumacrocentrus, 176: 120.
Eumayria, 41: 147.
Eumegaspilus, 46: 49.
Euophthalmomyia, 238: 339.
Euoxysoma,
 emendation of *Evoxysoma*.
Eupachylomma, 96: 58.
Euphoridea, 176: 116.
Euporiella, 176: 116.
Eurycephalus, 222: 61.
 preocc., = *Eurycranium* Ashm.
Eurycranium, 238: 326.
 n. n. for *Eurycephalus* Ashm.
Eurymeloides, 63: 126.
Eurymutilla, 153: 56.
Eurytomocharis, 50: 42.
Eusayia, 242: 126.
 n. n. for *Sayiella* Ashm.
Euspinolia, 232: 325.
Eustypiura, 238: 251, 412.
Eusynhalonia, 162: 63.
Eutrichosoma, 156: 204.
Euurobracon, 176: 140.
Evoxysoma, 50: 42.
Exoristobia, 237: 15.

Ferreolomorpha, 173: 188.
Fidiobia, 101: 170.
Figitodes, 119: 182.
Foxia, 147: 187.
Froggattia, 238: 238.
 preocc., = *Eufroggattia* Ashm.

Gillettea, 130: 69.
Glyptapanteles, 244: 147.
Glyptocolastes, 176: 142.
Glyptodoryctes, 176: 144.
Glyptogastra, 176: 57.
Glyptometopa, 144: 251.
Gonaporus, 193: 88.
Gonaspis, 130: 68.
Guérinius, 213: 100.
Gymniopterus, 145: 213.

Habrobracon,
Ent. News, vi, 324, 1895.

Habroleptopteryx, 172: 359.

Hapalomellinus, 168: 300.

Harpactostigma, 168: 299.

Harrimaniella, 176: 52.

Hemænasius, 172: 374.

Hemencyrtus, 172: 374.

Hemiephialtes, 259: 177.

Hemiglyptus, 255: 412.

Hemilexodes, 88: 399.

Hemitaxonius, 151: 311.

Hemithynnus, 213: 101.

Hemitorymus, 238: 243, 400.

Henicopygus, 172: 355.

Heptamerocera, 117: 760.

Heptasmicra, 238: 252, 451.

Hexacladia, 74: 456.

Hexasmicra, 238: 252, 454.

Hippocephalus, 53: vii.
preocc., = Zagrammosoma Ashm.

Holcencyrtus, 172: 394.

Holcopasites, 162: 82.

Holcopeltoideus, 238: 341.

Homœoneura, 151: 313.

Hoplitalysia, 176: 105.

Hoplocrepis, 66: 235.

Hoplogryon, 88: 200.

Hoplomutilla, 153: 57.

Hoplonomia, 237: 4.

Hoplopasites, 149: 284.

Hoplopria, 88: 388.

Hoploteleia, 88: 227.

Hubbardiella, 238: 339.

Hylæosoma, 149: 284.

Hypocrabro, 164: 168.

Hypodiranchis, 187: 303.

Hypoferreola, 193: 82.

Hypomellinus, 168: 299.

Hypomicrogaster, 139: 166.

Hypopteromalus, 238: 320.

Hyposyntactes, 195: 217.

Hypotaxonius, 151: 311.

Hypothyreus, 164: 171.

Ichneutidea, 176: 133.

Idoleupelmus, 125: 13.

Ischnopsis, 125: 16.
preocc., = Zaischnopsis Ashm.

Ischyrocnemopsis, 176: 81.

Isodyctium, 143: 127.

Isosomocharis, 50: 42.

Isosomodes, 50: 42.

Isosomorpha, 50: 42.

Isotiphia, 207: 43.

Iswaroides, 153: 50.

Joppoceras, 176: 39.

Kahlia, 176: 107.

Kiefferia, 209: 10.
preocc., = Kiefferiella Ashm.

Kiefferiella, 212: 221.

n. n. for Kiefferia Ashm.

Klugianus, 213: 102.

Koebelea, 238: 238.
preocc., = Eukoebelea Ashm.

Kriegeria, 254: 116.

Lælius, 88: 50.

Lapitha, 88: 222.

Lasiokapala, 157: 240.

Lecaniobiuss, 125: 17.

Leptobatopsis, 176: 47.

Leucospilomutilla, 230: 310.

Limnerium, 182: 368.
n. n. for Limneria Holmgren.

Liyolyda, 145: 209.

Liosigalphus, 176: 125.

Liotryphon, 182: 368.
n. n. for Liogaster Kriechb.

Lophocomodia, 53: vi.

Lophyridea, 146: 226.

Lophyrotoma, 146: 230.

Lysiognatha, 107: 276.

MacGillivraya, 148: 257.

Macreupelmus, 125: 14.

Macrocerceucola, 41: 153.

Macrodyctium, 176: 138.

Macrorileya, 238: 264.
Macroteropsis, 162: 85.
Magrettina, 186: 444.
Manoxyela, 140: 214.
Marlattia, 150: 287.
Matsumurias, 259: 169.
Mayromyrmex, 256: 381.
Megaplastopria, 211: 31.
Megarhyssa, 182: 368.
 n. n. for *Thalessa Holmgren*.
Megaspilidea, 46: 49.
 —= *Ceraphron Jurine*, 88: 123.
Megaspilodes, 46: 48.
 —= *Habropelte Thomson*, 88: 104.
Megaxyela, 140: 214.
Melanobracon, 176: 138.
Melanoporus, 196: 132.
Melanosmicra, 238: 251, 447.
Melanostelis, 149: 283.
Meliturgopsis, 162: 62.
Mellinogastra, 168: 300.
Meromyzobia, 172: 349.
Mesitiopterus, 200: 231.
Mesolelaps, 187: 313.
Mesostenoides, 176: 45.
Metacrabro, 164: 169.
Metadontia, 54: 87.
Metanysson, 169: 326.
Metarhyssa, 176: 40.
Meteoridea, 176: 129.
Micrandrena, 162: 89.
Micrange, 145: 213.
Micreumenes, 199: 208.
Microbracon, 69: 15.
Micromutilla, 153: 59.
Mimecomutilla, 232: 327.
Mirocerus, 238: 309.
Mischosmicra, 238: 251.
Mischoxorides, 182: 368.
 n. n. for *Clepticus Haliday*.
Miscophinus, 147: 187.
Moniæcera, 165: 220.
Monobiella, 199: 209.
Monophadnoides, 148: 253.
Mormoniella, 238: 316.
Myiocnema, 179: 349.
Myrmecopria, 88: 446.
Myrmecosalius, 220: 308.
Nannopompilus, 193: 82.
Nasonia, 238: 317.
Nawaia, 259: 184.
Neoblacus, 176: 122.
Neocatolaccus, 238: 320.
Neoceraphron, 88: 136.
Neoeryma, 139: 169.
 n. n. for *Eryma Först*.
Neolarra, 69: 8.
Neolelaps, 187: 312.
Neopasites, 149: 284.
Neoperdita, 162: 85.
Neoperga, 146: 232.
Neophotopsis, 230: 306.
Neophylax, 176: 119.
Neopimpla, 176: 56.
Neoptilia, 145: 213.
Neorileya, 238: 264, 466.
Nesolinoceras, 260: 294.
Nesolynx, 252: 966.
Nesomesochorus, 252: 967.
Nesomyia, 238: 344.
Nesopimpla, 259: 180.
Nitelopterus, 127: 22.
Nomadopsis, 149: 285.
Nomiæphagus, 153: 56.
Notanisomorpha, 238: 356.
Nothosmia, 162: 75.
Notoxoides, 211: 30.
Octosmicra, 238: 252, 450.
Odonteucoila, 212: 222.
Odontomutilla, 153: 55.
Œnonogastra, 176: 105.
Œthecoctonus, 182: 368.
 n. n. for *Cacus Riley*.
Ooderella, 125: 10.
Ooencyrtus, 172: 381.
Opheltoideus, 176: 95.

Ophiogastra, 182: 368.
 n. n. for *Ophioches* Hartig.
Opiellus, 182: 368.
 n. n. for *Zetetes* Först.
Opisoxestus, 176: 40.
Opisthacantha, 88: 221.
Opisthoneura, 150: 287.
Oresimus, 176: 123.
Orgilomorpha, 176: 123.
Orgiloneura, 176: 129.
Orthonotomyrmex, 258: 31.
 n. n. for *Orthonotus* Ashm.
Orthonotus, 256: 384.
 preocc. = *Orthonotomyrmex*
 Ashm.

Pachycrepoideus, 238: 329.
Packardiella, 238: 364.
Pambolidea, 176: 147.
Paracaratomus, 99: 335.
 emended to *Paracaratomus*.
Paracrias, 238: 343, 510.
Paræphylus, 176: 147.
Paragathis, 57: 638.
 = *Agathirsia* Westwood, 176: 128.
Paramiomœa, 117: 751.
Paramiomera, 214: 14.
 emendation of *Paramiomœa*
 Ashm.
Paraolinix, 102: 166.
Parapanteles, 176: 131.
Paraperga, 146: 232.
Parapteromalus, 238: 320.
Paraspishes, 238: 328.
Paraselandria, 148: 255.
Parasiobia, 151: 308.
Paraspalangia, 238: 334.
Parateras, 135: 262.
Paraterobia, 238: 274.
Parazarca, 143: 128.
Parencyrtus, 172: 368.
Pelorotelus, 238: 341, 508.
Pentacantha, 46: 51.
Pentamerocera, 117: 774.

Pentasmicra, 238: 252, 455.
Pentastichus, 102: 187.
Perditomorpha, 162: 86.
Periclistoptera, 148: 255.
Péringuuya, 232: 327.
Phænopria, 88: 436.
Pheidoloxenus, 238: 328.
Philoxanthus, 149: 285.
Phorbas, 88: 90.
Phylloteras, 130: 67.
Phylloxerexenus, 50: 42.
Pimplopterus, 176: 52.
Plagiotypes, 176: 20.
Platymischoides, 187: 206.
Plesiostigmodes, 238: 243, 400.
Pleuroneurophion, 176: 86.
Pœciliopompilus, 193: 82.
Pœcilostomidea, 148: 256.
Polistella, 244: 133.
Polydontoscelis, 63: 126.
Polysphinctomorpha, 176: 59.
Polystichophagus, 151: 310.
Pompilinus, 193: 85.
Pompilogastra, 193: 81.
Pristomeridia, 176: 100.
Pristomutilla, 232: 329.
Pristosmicra, 238: 386.
Probethylus, 201: 270.
Prodecatoma, 238: 261, 463.
Promiomera, 212: 221.
Prospaltella, 242: 126.
 n. n. for *Prospalta* Howard.
Protapanteles, 139: 166.
Protaphidius, 182: 368.
 n. n. for *Cœlonotus* Först.
Proterocryptus, 259: 174.
Protomicropitis, 139: 167.
Protothyreopus, 164: 170.
Provancheria, 176: 109.
Provespa, 217: 182.
Psammothymus, 213: 102.
Pseudælurus, 213: 99.
Pseudamblyteles, 176: 18.
Pseudanthophilus, 168: 294.

Pseudapanteles, 139: 166.
 Pseudaulax, 228: 213.
 Pseudelaphroptera, 213: 101.
 Pseudencyrtus, 172: 396.
 Pseudeucoila, 212: 222.
 Pseudeugalta, 176: 55.
 Pseudochalcura, 238: 268, 468.
 Pseudocrabro, 164: 169.
 Pseudocyphona, 145: 211.
 Pseudohelioryctes, 167: 248.
 Pseudomalus, 200: 229.
 Pseudomasaris, 200: 221.
 Pseudometagea, 157: 239.
 Pseudomethoca, 119: 181.
 Pseudoperga, 146: 232.
 Pseudoplilus, 169: 323.
 Pseudosalius, 244: 132.
 Pseudosiobia, 151: 308.
 Pseudotiphia, 205: 6.
 Psyllaphagus, 172: 382.
 Pterygophorinus, 146: 230.
 Ptinobius, 125: 11.
 Pycnomutilla, 234: 8.
 Pycnophion, 176: 87.
 Pycnopompilus, 193: 83.
 Pycnothynnus, 213: 101.
 Pyrrhomenlecta, 162: 66.
 Pyrrhomutilla, 153: 56.
 Radoszkowskiius, 232: 327.
 Raia, 88: 221.
 = Opisthacantha Ashm., 88: 221.
 Reedia, 234: 9.
 Rhynchothyreus, 182: 368.
 n. n. for Zarhynchus Ashm.
 Rhytidothorax, 172: 377.
 Rileya, 50: 42.
 Sactopus, 176: 146.
 Sayiella, 238: 251.
 preocc., = Eusayia Ashm.
 Sceliomorpha, 88: 239.
 Schauinslandia, 176: 120.
 Schlettererius, 176: 150.
 Schwarzella, 238: 256.
 Scorpioleia, 128: 53.
 Scotolinx, 238: 354.
 Scymnophagus, 238: 319.
 Sericopompilus, 193: 82.
 Sierolomorpha, 207: 42.
 Signiphora, 5: 30.
 Solenaspis, 41: 155.
 Solemozopheria, 41: 149.
 Sophropompilus, 193: 84.
 Spathopus, 238: 272.
 Sphæroteras, 130: 67.
 Sphecodogastra, 162: 92.
 Spilomutilla, 232: 324.
 Spilopompilus, 193: 81.
 Spilothynnus, 213: 103.
 Spinoliella, 162: 84.
 Stantonia, 244: 146.
 Stenocrabro, 165: 216.
 Stenomesioideus, 238: 355.
 Stigmatocrepis, 238: 273.
 Strongylogastroidea, 151: 308.
 Stylidolon, 128: 53.
 emended to Stylidodon.
 Stylophorella, 238: 275.
 Sycosapterella, 238: 239.
 Sycosapteridea, 238: 239.
 Sympiesomorpha, 238: 352, 518.
 Synophromorpha, 226: 145.
 Synorhopalum, 165: 218.
 Synothyreopus, 165: 213.
 Syrphophagus, 172: 397.
 Systolodes, 50: 42.
 Systolomorpha, 178: 339.
 Syzygonidea, 146: 230.
 Tachardiæphagus, 238: 303.
 Tachinæphagus, 238: 304.
 Tachypompilus, 193: 83.
 Taftia, 244: 137.
 Tanæmyrmex, 256: 384.
 Tanaostigmodes, 125: 18.
 Terobiella, 178: 343.
 Tetracnemopsis, 172: 358.
 Tetraloniella, 162: 61.
 Tetralophidea, 172: 348.

Tetralophiellus, 172: 357.
 Tetramerocera, 117: 778.
 Tetranemopteryx, 238: 239.
 Tetraodontonyx, 173: 187.
 Tetraphotopsis, 230: 305.
 Tetraplasta, 214: 68.
 Tetrascolia, 205: 8.
 Tetrasmicra, 238: 252, 456.
 Tetrasphæropyx, 57: 634.
 Tetrastichodes, 42: 203.
 Tetratneura, 148: 256.
 Thynnidea, 213: 98.
 Thyreocera, 41: 154.
 Thyreosphe, 245: 282.
 Timulla, 153: 55.
 Tineobius, 125: 14.
 Tineophotonus, 172: 351.
 Tomicobia, 156: 203.
 Tosquinetia, 182: 368.
 n. n. for Obba Tosq.
 Trevoria, 176: 50.
 Trichencyrtus, 238: 291, 495.
 Trichopria, 88: 431.
 Trichoteras, 130: 67.
 Trigonogastra, 238: 330.
 Trigonospilus, 176: 134.
 Trisacantha, 38: 117.
 Trismicra, 238: 252, 456.
 Trisolenia, 41: 142.
 Trissacantha, 88: 182.
 emendation of Trisacantha.
 Trissarthrum, 176: 148.
 Trissodontaspis, 212: 222.
 Trissolcus, 88: 161.
 Trogaspidia, 153: 58.
 Trogomorpha, 176: 15.
 Tropideucoila, 212: 221.
 Tropidobracon, 176: 139.
 Tropidogastra, 238: 323.
 Tropidopria, 88: 416.
 Tropidopsis, 88: 402.
 Typhocetes, 153: 53.
 Uriella, 119: 221.
 Uroderostenus, 238: 343.
 Uroentedon, 238: 341, 504.

Urogaster, 139: 166.
 Urosigalpus, 57: 637.
 Viereckia, 232: 324.
 Websterellus, 87: 164.
 Westwoodella, 238: 359.
 Xanthoatomus, 238: 360.
 Xanthoencyrtus, 203: 302.
 Xanthomelanus, 238: 251, 447.
 Xanthosoma, 50: 42.
 Xanthoteras, 135: 261.
 Xenaporus, 193: 88.
 Xenoglossodes, 162: 63.
 Xenomutilla, 232: 330.
 Xestocabro, 164: 169.
 Xylocabro, 164: 169.
 Xystoteras, 135: 260.

Zacesta, 162: 73.
 Zacosmia, 149: 282.
 Zacranius, 187: 295.
 Zacryptocerus, 256: 384.
 Zadontomerus, 162: 69.
 Zaeucoila, 212: 222.
 Zaglyptogastra, 176: 137.
 Zagrammosoma, 238: 354.
 n. n. for Hippocephalus Ashm.
 Zaischnopsis, 242: 126.
 n. n. for Ischnopsis Ashm.
 Zamegaspilus, 176: 141.
 Zamischus, 212: 221.
 Zadontomerus,
 emendation of Zadontomerus.
 Zaomma, 172: 401.
 Zaommomyia, 238: 340.
 Zarhopalus, 172: 406.
 Zarhynchus, 176: 59.
 preocc., = Rhynchothyreus Ashm.
 Zaschizonyx, 148: 257.
 Zaspilothynnus, 213: 99.
 Zelomorpha, 176: 129.
 Zonocryptus, 176: 40.
 Zonopimpla, 176: 55.
 Zopheroteras, 135: 261.

NOVEMBER 12, 1908.

The 225th regular meeting was held at the Saengerbund Hall, 314 C street, N. W. President Hopkins presided and there were present Messrs. Barber, Burgess, Burke, Crawford, Currie, Davis, Dyar, Ely, Gahan, Heidemann, Hopkins, Howard, Knab, Mann, Morgan, Patten, Sanders, Sasscer, Schwarz, Ulke, and Webb, members, and Messrs. Clemons, Fox, Hammar, Hyslop, Russell, Smith, Smyth, Strauss, and Wellman, visitors.

Messrs. J. A. Hyslop and D. K. McMillan were elected active members of the Society.

—Dr. F. C. Wellman, the well-known explorer of the fauna and flora of Portuguese West Africa, spoke by invitation on the general entomological features of that region. It being impossible to more than touch upon a few of the many forms in his notes, he remarked upon a number of typical species, among them being the following:

Arachnida. The spiders of the district are most interesting. Remarks were made on the habits of *Nephila senegalensis*, *N. pilipes*, *Araneus rufipalpis*, *Selenops radiatus*, *Paraplectana thorntoni*, *Lathrodetus hasselti*, etc.; also on the Solpugidæ (*Solpuga vineta*, *S. marshalli*, etc.) the latter being erroneously considered venomous by the indigenous blacks. Among the scorpions the most prominent are *Uroplectes occidentalis* and the formidable *Parabuthus granulatus*, the bite of the former being not much more severe than a wasp sting, while that of the latter gives rise to very serious symptoms. The most striking mite is the big red "velvet bug," *Trombidium grandissimum*, which is evidently protected from the attacks of birds, etc., by its warning color. Other interesting groups are the Gamasidæ infesting beetles, which may almost cover the insect, and the Oribatidæ found in mosses. Remarks were made on the value of these latter as illustrating the zoogeographical areas of the region under discussion. A number of ticks were discussed. *Amblyomma hebraicum* causes painful itching in human beings. *Margaropus decoloratus*, *Rhipicephalus coriacaeus*, *Margaropus annulatus*, etc., abound in cattle, horses, and

mules. *Ornithodoros moubata* transmits both human spirochaetosis and filariasis. Experiments were made looking towards its extinction. A fungus (allied to *Entomophthora*), which kills it, and a bug, *Phonergates bicoloripes*, which preys on it, were discovered but could not be employed practically. Changing men from beds to hammocks with cotton wool surrounding the suspending ropes was successful in a large measure as a protective device.

Myriapods. Venomous species (*Scolopendra morsitans* and *leata*) were mentioned, also several species of *Cormocephalus*. Two genera of large julids (*Spirostreptus* and *Odontopyge*) were discussed at some length.* A curious fact hitherto unnoted is that at the end of the dry season when the struggle for existence is very fierce these millipedes excrete an excess of irritating material from the *foramina repugnatoria*, which runs down on the legs, making them poisonous, so that the track of one, if it crawl over the human skin, leaves a weal like that made by a red-hot iron.

Insects. Thysanura were first taken up. On one occasion only, at the end of the rainy season, vast numbers of a small blue-black podurid were seen almost completely covering the surface of small ponds. Campodeidæ (which run backward and forward with equal facility) frequent bungalows and are used by children as playthings. Some of the species of Lepismatidæ are very large, and some are predaceous, having been observed to prey on beetle larvæ and also on the imagines of the common wood-borer *Bostrichopsis cephalotes*, entering the burrows of these latter and invading the beetle, leaving the eviscerated exoskeleton to fall to the ground. Among dragon flies *Crocothemis sanguinolenta*, *Orthetrum chrysostigma*, and *O. caffrum* were pointed out as striking and beautiful insects. The latter species was once seen carrying about a small snail. Termites have many types of habit. Some serve like earth-worms in loosening the soil. One species has soldiers which

* During the discussion which followed, Doctor Wellman, in answer to questions, entered more fully into the distribution, copulation, early stages, means of defence from enemies, and other habits of these millipedes.

discharge an irritating fluid from a tube opening on their heads. Still another lives on top of the ground in bright sunlight. *T. bellicosus* is the commonest species and *T. fatalis* builds the highest mounds, often 15 feet in height. Their ravages are enormous. Earwigs are numerous and remarkable. Some are of large size (*Apachya chartacea* and *A. reichardi*). The most interesting is a gigantic new genus and species (*Sacnodes wellmani*) which nips severely with its pincers, drawing a drop of blood. As it lives in refuse the wound inflicted often festers badly and the natives have come to consider it venomous. A large Australian species (*Anisolabis colossa*) has much the same habits and reputation. A number of species of Orthoptera were mentioned, among them the giant cricket (*Brachytrypus membranaceus*), which is used for food, and the travelling locust (*Schistocerca peregrina*). This latter appears in clouds which darken the sun. It is often infested by a nematode (*Gordius*), and is eaten in vast quantities by a plover-like bird (*Glareola nordmanni*). Locusts are employed by the indigenous blacks as an article of diet. On one occasion the insects were found dying over a large area but the cause of death could not be ascertained. Bugs were next taken up. The common bed bug is not *lectularius* but a new species. Reduviidæ are striking and include several "kissing bugs," notably *Sphedanolestes wellmani*. Among Homoptera there are a number of very large handsome cicadas belonging chiefly to the genus *Platypleura*. A number of Lepidoptera were collected. A singular fact is that a large moth (*Macroglossa trochiloides*) is usually mistaken by the colonists for a hummingbird. The larvæ of various Limacodidæ, Arctiidæ, and Liparidæ have caterpillars with stinging hairs, causing urticaria when handled. Several very large saturnids were also mentioned, as well as the habits of the very common *Limnas chrysippus* and the gregarious *Lampides telenanus*, etc. Diptera (including fleas) were next reviewed. The ovipositing of an ephydrid fly in ants (*Cremastogaster*) was mentioned as a striking departure from the usual habits of the family. The terrible "veldt gnat" (*Simulium wellmani*), the parasitic "floor maggot" (*Auchmeromyia luteola*), the

myrmecophilous *Runchomyia wellmani*, mosquitoes, and tse-tse flies were all touched upon. Beetles (of which a large collection was made) came next. The stinging larvæ of a malacoderon (*Drilus*) and of an elaterid (*Tetralobus*) were first mentioned. *Zographus ferox* was spoken of as a common article of food, together with large buprestids. One of these latter (*Psiloptera monstruosa*), of very remarkable appearance, was commented upon. The tiger beetles and the blister beetles were specially discussed in relation to geographical distribution and general biological conditions in the region. Numerous species of Hymenoptera were referred to. Formidable social wasps (*Belonogaster guerini*, *Polistes fastidiosus*, etc.) and some large species of *Scolia*, *Salius*, etc., were described. Many bees, a majority of them new, were collected. The existence of mites (*Paragreenia*) in an abdominal pouch of a carpenter bee was reported. The address closed with some notes on the habits of certain ants, *Camponotus wellmani*, *Pheidole punctulata*, *Polyrhachis militaris*, and *Paltothyreus tarsatus*.

—Doctor Howard introduced Dr. F. B. Smith, Director of the Transvaal Department of Agriculture. Doctor Smith told of the great debt that the other countries owe to the United States for the progress in economic entomology, and also spoke of the excellent work of the late Mr. C. B. Simpson, a former member of this Society, who started the entomological work of the Transvaal Department of Agriculture and the Inter-Colonial Locust Bureau of South Africa.

—Mr. Charles R. Ely presented the following paper and exhibited specimens of the adults of the species treated and of some closely related species:

DESCRIPTIONS OF TWO NEW SPECIES OF ACROBASIS.

[Lepidoptera, Pyralidæ.]

BY CHARLES R. ELY.

Among some specimens of the genus *Acrobasis* taken by the writer at East River, Conn., were a few which are pronounced

by Dr. H. G. Dyar to belong to two species hitherto undescribed. Doctor Dyar has kindly allowed me the privilege of describing and naming them.

Acrobasis sylviella, n. sp.

Head and thorax ash-gray; abdomen gray, the segments ringed with yellow-gray. Fore wings ash-gray, with smoky shadings; the scale ridge very dark, broad and short; outer line dark, very distinct, accentuated by an outer pale-gray shade; beyond this a dark band followed by a lighter shade; a marginal row of dark dots; fringes pale; discal dots separate in two specimens, joined in one specimen. In the male there is, on the under side, a very short, black costal streak near the base of the fore wings and a notch on the costal margin near the base. Hind wings yellow-gray, with smoky tinge, dark near margin.

Expanse 19 to 20.5 mm.

Two males and one female, East River, Conn., July 19 and 22, 1908 (Chas. R. Ely).

Type.—No. 12115, U. S. National Museum.

Acrobasis irrubriella, n. sp.

This species is quite close to *Acrobasis latifasciella* Dyar,^a from which it may be distinguished by the following points of difference: Head and thorax not so reddish; band beyond the scale ridge narrower, only slightly marked with orange-red; outer line only slightly mesially exserted, not so distinctly denticulate, not followed by an orange-red shade.

Expanse 18.5-19.5 mm.

Two males and one female, East River, Conn., July 8, 20, and 24, 1908 (Chas. R. Ely).

Type.—No. 12116, U. S. National Museum.

—Doctor Howard exhibited drawings of the antennæ of *Tyndarichus* and *Schedius*, new genera of the family Encyrtinæ, and stated that these insects are egg parasites of the gipsy moth in Japan and apparently very important. He said that it is rather remarkable that two such closely related species should be parasitic on the same host in the same locality.

—Doctor Howard also exhibited a drawing of *Atoposomoidæ*, a new genus of Elachertinæ, and stated that while from

^a Notes on the species of *Acrobasis*, with descriptions of new ones, by Harrison G. Dyar, Proc. Ent. Soc. Wash., x, p. 45, 1908.

its relationships it would be expected to be a parasite of some tineid leaf miner, it was reared from the cocoons of *Glypta-panteles*.

—Mr. Webb exhibited an old wagon spoke which showed the work of the longicorn beetle *Chion cinctus* Drury. He stated that the evidence strongly indicated that the beetle had lived in the spoke for eight or ten years as a larva. It then changed to an adult, which was still living when received.

Mr. Schwarz called attention to the fact that the subject of retarded development had been thoroughly discussed by the Society at a previous meeting and that this discussion is recorded on pages 108-127 of Volume III of the PROCEEDINGS.

—Doctor Dyar presented a paper entitled "The Larva of *Lerina incarnata* Walk." It is as follows:

THE LARVA OF LERINA INCARNATA WALK.

[Lepidoptera, Lithosiidae.]

By HARRISON G. DYAR.

Larva. Head rounded, wider than high, truncate below, full; clypeus moderate, pale reddish, shining, the sutures of the mouth and ocelli darker. Body cylindrical, robust, whitish luteous, covered by the hairs, unmarked. Warts large, but low and flat, black, distinct, i to vi normal, iv rather large; on the thorax 2 warts above the stigmatal wart, large, distinct, separate; wart iii a small wart situated behind wart iv + v. Hair uniform, short, abundant, foxy reddish, evenly cut. Thoracic feet black, the abdominal ones with large black hairy plates, the inner sides of the legs also hairy. No cervical shield nor anal plate.

Food plant: "Milk weed," *Asclepias pumila* (A. Gray) Vail. Larvæ collected by Mr. Morris Chrisman, Huachuca Mountains, Arizona, and handed to me by Dr. A. D. Hopkins.

The larva has the structure of an arctian, not a lithosian.

—Mr. Schwarz recorded the discovery on the North American continent of the coleopterous parasite of the common cockroach (*Blattella germanica* L.), namely, the genus *Rhipidius*. Last year one dead male specimen was found by Mr. Frederick Knab on board of a steamer plying between San

Francisco and Central American ports, and in September of this year Dr. S. Austin Davis sent to Doctor Howard a female specimen which was found on board of one of the Panama Railroad steamers which ply between New York and Panama. Mr. Schwarz reviewed the history of this genus and said that he has come to the conclusion that the species is nothing else than the old *Rhipidius pectinicornis* Thunb. From the fact that the female has well developed legs and is provided with eyes and normal antennæ he concluded that the female leaves the body of the roach and crawls about as any ordinary beetle.

—Mr. Sanders exhibited photographs of adults and larvæ of the scale *Lophococcus mirabilis* Ckll., which were received from the northern Transvaal. They live on the acacia, the thorns of which the adults mimic. The larvæ resemble the winged seeds of some plants, but are not believed to be mimics.

—The Secretary read notes from Messrs. E. O. G. Kelly and T. D. Urbahns on some experiments with *Lysiphlebus tritici* Ashm., the hymenopterous parasite of the spring grain-aphis or so-called "green bug" (*Toxoptera graminum* Rond.). The breedings and rearings of this insect show that the species will parasitize not only *Toxoptera graminum* but also various other aphides—*Aphis setariae*, the cotton or melon aphis (*A. gossypii* Glov.), the corn root-aphis (*A. maidi-radicis* Forbes), the corn leaf-aphis (*A. maidis* Fitch), and the cabbage aphis (*A. brassicæ* L.). The experiments, in detail, are as follows: (1) Specimens of *Lysiphlebus*, reared from *Toxoptera*, parasitized *A. setariae*, their offspring (or the second generation) parasitized *Toxoptera*, and the third generation parasitized *A. setariae*, from which the adults developed. (2) *Lysiphlebus*, reared from *Toxoptera*, parasitized *A. setariae*, their offspring parasitized *A. maidis*, and from the latter the adults emerged. (3) *Lysiphlebus*, reared from *Toxoptera*, parasitized *A. maidi-radicis* (?) on *Erigeron canadense*, their offspring parasitized *Toxoptera*, and from the latter the adults developed. (4) *Lysiphlebus*, reared from *Toxoptera*, parasitized *A. gossypii* on primrose and from these the adults developed. (5) *Lysiphlebus*, reared from *A. setariae*, parasitized *Toxoptera*, their offspring parasitized *A. maidi-radicis* (?) on *Erigeron*,

and the adults from the latter parasitized *Toxoptera*, from which the adults emerged. (6) *Lysiphlebus* from *A. setariae* parasitized *A. maidis*, from which the adults were secured. (7) *Lysiphlebus* from *A. brassicae* parasitized *Toxoptera*, from which the adults were secured. (8) *Lysiphlebus* from *A. gossypii* on cotton, sent by Mr. C. N. Ainslie from Mesilla Park, N. Mex., parasitized *Toxoptera* and from the latter the adults emerged.

—The Secretary read also a note from Messrs. Kelly and Urbahns describing experiments showing parthenogenesis in *Lysiphlebus tritici* Ashm. Starting with a virgin female *Lysiphlebus* (the offspring of a fertilized female), issuing from a parasitized *Toxoptera* that had been placed in a vial, 101 of the offspring were males and 6 were females, each issuing in a separate vial. Four of these females were allowed to parasitize *Toxoptera*, and their offspring were all males. Starting with a supposedly fertilized female, a virgin female offspring was isolated; the offspring of this latter female comprised 69 males and 3 females, and the offspring of one of these 3 virgin females were 5 males and 2 females. One of the last-mentioned females, unfertilized and parasitizing *Toxoptera*, produced 51 males, while the other produced 15 males. In numerous cases no females were produced, in one instance the offspring of a single virgin female being 186 males.

—Mr. Schwarz said that a species of *Spirobolus*, a millipede, has transformed a thick layer of fallen leaves into a granular mass of excrement which covers the ground between the rocks along the upper Potomac River to a considerable depth. In some localities there is practically no soil except this layer of excrement.

—The following papers were presented for publication:

**BRASSOLIS ISTHMARIA, A LEPIDOPTEROUS INSECT
HIGHLY INJURIOUS TO COCOANUT CULTURE
IN THE PANAMA CANAL ZONE.**

By HENRY F. SCHULTZ.

Early in May, 1906, on my arrival on the Isthmus, I found the majority of the cocoanut trees in this neighborhood de-

foliated by the attacks of a caterpillar. Large trees which had been bearing crops for a number of years stood without a particle of foliage, their bare petioles and midribs resembling skeletons and with none of the ragged picturesqueness characteristic of this species. Some of the trees were in hopeless condition and had to be cut down, but the rest recovered under special care given them.

Later in the same year, about the middle of September, the caterpillars again appeared, although not in the same large numbers as before, and began to strip the trees anew. All cocoanut trees were, therefore, sprayed with a weak solution of arsenate of lead, a most tedious and troublesome, although very effective, method of combating these insects, in view of the great height of the trees, most of which measured from 30 to 35 feet. This time some of the royal palms were also, but not very badly, affected, and in their case spraying was out of the question, their still greater height making it impossible to reach them by ladders; and "royals," particularly the *Oreodoxa oleracea*, have too thick a trunk to allow even the natives to climb them.

Although the torrential rains washed off the arsenate of lead after a few weeks, it stayed on long enough to kill all the insects on the trees which had received treatment, but a number evidently reached maturity on the royal palms and deposited their eggs in turn on the cocoanut trees.

This year (1907) the caterpillars made their first appearance in May, during my absence from Ancon through vacation, and I found a number of trees sporadically infested with them on my return. I suppose this was the time when the mature insects deposited their eggs freely on all cocoanut trees in this vicinity, for about the latter part of August thousands of their larvæ began to defoliate these palms again, evidently determined not to leave a single leaf on the trees.

One thing in their favor is the circumstance that the larvæ feed only at night and that they retire before the first sun-rays into a tough web spun with pinnæ of the leaves, where frequently as many as 700 to 800 of them crowd together into one "nest." The lower part of this, where the ends of the pinnæ meet, is left slightly open, probably through instinct of the caterpillars, to allow for the escape of their dung, and the whole presents the appearance of a long narrow bag, from 30 to 60 centimeters in length, according to the number of insects it contains. Frequently a tree will have two, three, and even four of these "nests" and some were found with an estimated number of over two thousand full-grown larvæ. What even

half of this number can do to a full-grown tree, if their ravages are not speedily intercepted, can be imagined, especially if the fact is kept in mind that they attain the respectable size of 5 to 10 centimeters in length, and that their appetite, like that of most other caterpillars, is altogether monstrous.

A bearing cocoanut tree will thus be stripped of every inch of foliage in a few nights and receive such a severe check in its growth that, even with all due care in preventing the re-appearance of the pest in the following years, at least two or three crops will be lost. It is no rare occurrence, however, that a tree will die outright, or become so weak that it can not resist fungous and other diseases, and will gradually perish.

After reaching maturity, or when the supply of food gives out, the larva passes into the chrysalis stage, in which it remains 12 to 16 days, and this is the time when the larva of an apparently dipterous insect helps in the destruction of the *Brassolis*.

I have not been able to find out whether the mature parasite deposits its eggs cutaneously into the caterpillar, or into the chrysalis, or whether its ova are introduced into the alimentary tract of the larva with its food, as I have found the parasite larva only in the chrysalides. Doctor Darling, Chief of the Board of Health Laboratory at Ancon, had examined almost mature larvæ of the *Brassolis* under a high-power microscope without finding any traces of parasite ova in either the skin or intestinal ducts. However, as only a small number of them could be thus examined, on account of lack of time, it is possible that the few specimens under observation were not parasitized. As the parasite larvæ are not protected with a skin which, in my judgment, would be tough enough to withstand the gastric juices of their host, the probability of a cutaneous infestation suggests itself.

The destruction of the *Brassolis* through its parasite seems to be rapid, although the actual time required can not be given, as those in captivity appeared to be free from infestation.

From the microscopic examination of the contents of three diseased and dead chrysalides by Doctor Darling, the following points were learned: The contents were fluid and granular, and a fresh smear showed many fat droplets, discrete and in round aggregations (mulberry-like). The tracheal tubes were found in some brown débris, but no parasite ova, bacteria, or micro-organisms of any kind could be detected. With the polarizing microscope the fat droplets did not show crosses.

The fat droplets take the stain well with Sudan III. Stained with polychrome methylene blue, there are numerous eosin

stained disks resembling red blood corpuscles, about 3 microns in diameter, many large fat globules, a few mononuclear cells, and no micro-organisms; otherwise negative.

As above stated, the larvæ feed only at night and try to hide in their "nests" during the day, but this "hiding" becomes in reality the means by which they are most easily detected and destroyed, for it is much easier to cut down these "nests" than to spray the trees; nevertheless, it requires constant vigilance on the part of the grower. Where the trees stand isolated, as here on the hospital grounds, the insects are more easily controlled than in a grove where the trees frequently touch one another and where the caterpillars can crawl from tree to tree. Altogether, the *Brassolis* will turn out to be a most formidable enemy for the cocoanut grower if it is allowed to spread, and every possible attention should be given to the immediate destruction of the larvæ at their first appearance. I will add that I have noticed *Brassolis isthmia* on the following wild and cultivated palms of the Isthmus, besides cocoanut: *Martinesia caryotæfolia*, *Acrocomia sclerocarpa*, *Oreodoxa regia* and *oleracea*, and two unidentified species of *Thrinax*.

A NEW COCCID OF THE GENUS ERIOCOCCUS.

By T. D. A. COCKERELL.

I have recently received, through Prof. R. H. Forbes, a species of *Eriococcus* collected by Mr. D. J. Craig at Bellevue, Gila Co., Ariz., on *Quercus toumeyi* Sargent, occurring on the small twigs in company with a species of *Eulecanium*. Upon examination it proves to be one of the species or races of the *E. quercus* group, distinctly differing both from true *quercus* and from *toumeyi* Ckll., the latter being from Arizona, on *Prosopis*. It may be described as follows:

Eriococcus quercus gilensis, n. subsp.

Ovisac pure white, ordinary, about 4 mm. long. On boiling in caustic potash the insect does not stain the liquid pink. Dermal spines strong, about 45μ long. Tibia always longer than tarsus. Antennæ 7-jointed, joint 4 always longest, longer than 3, which averages a little longer than 7; 5 and 6 short and equal.

The following measurements are in μ . Femur and trochanter: Middle, 190; hind, 205. Tibia: Anterior, 125; middle, 145; hind, 150. Tarsus (without claw): Anterior, 67; middle, 75; hind, 82. Antennal joints, different examples: (2) $37\frac{1}{2}$, 30, 30; (3) $42\frac{1}{2}$, $42\frac{1}{2}$, $37\frac{1}{2}$, 35; (4) $57\frac{1}{2}$,

52½, 45, 37½; (5) 22½, 25, 22½, 22½; (6) 22½, 25, 22½, 20; (7) 35, 37½, 35, 30.

A NEW BRACONID OF THE GENUS ELASMOSOMA.

By T. D. A. COCKERELL.

On the afternoon of July 16, 1908, at Boulder, Colo., my wife called me to see a great battle between the ants *Formica sanguinea* Latr. and *F. subpolita* Mayr. which was taking place on the pavement adjacent to the university campus. As we watched the conflict, my wife noticed certain minute insects hovering over the ants. They remained hovering in the air about an inch above the ground, darting downwards at intervals to alight for an instant on the back of a worker *F. subpolita*. Two specimens were collected, and, as was expected, they proved to belong to the curious genus *Elasmosoma*.*

Elasmosoma vigilans, n. sp.

Female. Length, 2 mm. or slightly more; black with a dullish surface, the abdomen more shining; abdomen a little shorter than thorax; wings hyaline, the costa and stigma dark brown; legs very pale reddish, the tarsi white, black at apex; antennæ dark, 12-jointed, the flagellar joints with numerous longitudinal keels, and with many short pale hairs; broad apical margin of clypeus, labrum, and mandibles very pale yellowish, the apices of the mandibles ferruginous; mandibles strongly bidentate, the inner tooth about half as long as the outer; face and front with fine transverse lineolation, passing into reticulation; mesothorax with very fine punctures of two sizes, and scattered short pale hairs; scutellum similarly sculptured; sides of metathorax with coarse irregular reticulation; abdomen with very fine and very dense punctures, its lateral margin sharp; basal part of marginal neurone brown and distinct, but it ends before level of end of stigma in a swelling, and beyond that is merely indicated by a faint shade. The middle and hind coxae are pale, concolorous with their trochanters and femora.

The short abdomen alone will readily separate this from *E. schwarzi* Ashm. and *E. pergandei* Ashm.; from *E. bakeri* Ashm. (from Fort Collins, Colorado) the color of the middle and hind coxae would serve as a mark of distinction, but as *E. bakeri* is only known in the male, it occurred to me that the present insect might be its female. Mr. J. C. Crawford has very kindly compared one of my specimens (now in the U. S. National Museum) with the type of *E. bakeri*, and is of the opinion that it is distinct. In *E. bakeri* the region in front of the

* Discussed by Ashmead in Proc. Ent. Soc. Wash., III, p. 280.

ocelli is merely transversely striate, whereas in *E. vigilans* it is punctured, the punctures running in rows between the striæ, or, more properly, raised lines.

Boulder, Colo., evidently parasitic on *Formica subpolita*.

A NEW GALL-MAKING COCCID ON ATRIPLEX.

By T. D. A. COCKERELL AND S. A. ROHWER.

In October, 1896, in the outskirts of Las Cruces, New Mexico, Prof. C. H. T. Townsend found a bush of *Atriplex canescens* on which were many small leaf-galls. The senior author studied these at the time, and later collected additional material, but was not able to come to a definite decision as to the gall-maker. The galls all contained remains, more or less imperfect, of what appeared to be an *Eriococcus*, but the material was somewhat old, and had been very much injured by both chalcidid and dipterous parasites. Moreover, the locality was exactly the type-locality of *Eriococcus neglectus* Ckll., and it seemed possible that we had to do merely with some *E. neglectus* which had crawled into galls otherwise made.

This unsatisfactory conclusion could not be modified until this year, when Mr. L. C. Bragg rediscovered the galls on *Atriplex canescens* at Trinidad, Colo. Mr. Bragg has sent us good material, and there appears to be no doubt that we have to do with a distinct and undescribed gall-making coccid.

ATRIPLICIA, n. gen.

Female gall-making; having the general structure of *Eriococcus*, but with only bristles, the spines of *Eriococcus* absent. Antennæ 7-jointed, formed as in *Eriococcus*, the last joint not the longest; caudal tubercles long and cylindrical; anal ring with 8 hairs; legs well developed, the tarsus (excluding claw) a little longer than tibia.

Atriplicia gallicola, n. sp.

Oval, about 1.5 mm. long, reddish pink when fresh, turning dull crimson when boiled in caustic potash; not enclosed in an ovisac. Skin with scattered bristles, not numerous. Antennæ and legs red-brown, of ordinary form, the claws long. Caudal tubercles cylindrical, about $30\ \mu$ long and $20\ \mu$ broad at base, emitting a long bristle (about $105\ \mu$). Antennæ 7-jointed, the joints measuring in μ (1) 20-25, (2) 22-25, (3) 33, (4) 28, (5) 18, (6) 15, (7) 28. The tibiae are about 77 (anterior leg) to 100 (hind leg) μ long, the tarsi 80 to 105 μ .

The gall, about 4.5 mm. long, consists of the subglobular swollen base of the *Atriplex* leaf, the sides being folded upwards, leaving an open slit above, the margins of which are curled outward. The end of the leaf makes a pointed process at the end of each gall.

Las Cruces, N. Mex. (Townsend and Cockerell); Trinidad, Colo. (L. C. Bragg). Trinidad is the type locality.

Mr. Bragg also reports that he found *Kermes gillettei* at Trinidad.

PARASITE.

A very interesting parasite has been reared from this insect, which seems to possess characters common to the Encyrtinæ and Aphelininæ. The material is not in condition for description, but this statement is made in the hope that some future observer, finding *Atriplicia*, will try to rear a good series of the parasite.

THREE NEW TICKS FROM THE UNITED STATES.

BY NATHAN BANKS.

In describing *Dermacentor venustus* in my Revision of the Ixodoidea, or Ticks, of the United States,* I had a few specimens that would hardly fit and were left unnamed, or placed doubtfully with that species. Several males, in the collection of the Department of Agriculture, were from Prescott, Washington, taken from a horse in February, 1896. Since the publication of the Revision I have received several ticks from Dr. H. T. Ricketts, who is interested in the spotted fever, and among the material were two females and a male from a horse at Mountain Home, Idaho. These agree with the specimens from horse at Prescott and differ from *D. venustus* in several ways, so that I shall describe it as follows:

Dermacentor modestus, n. sp.

Male. Red-brown, marked with white lines and dots, but not so heavily as in *D. venustus* or *D. occidentalis*; the heaviest marking outlines the region of the shield of the female; legs slightly marked with white. Capitulum scarcely as broad as that of *D. venustus*, the hind angles hardly as much produced; dorsum hardly as much widened behind as that of *D. venustus*, punctulate as in the allied forms; hind coxae about twice as wide as long on base, armed as usual.

Length, male, 3.5 mm.

* Technical Series, No. 15, Bureau of Entomology, U. S. Department of Agriculture, 1908.

Female. Capitulum and legs reddish brown; shield mostly white on sides and behind, leaving much of the middle area unmarked, abdomen dark brown. Capitulum broad, rather broader than in *D. venustus*, with smaller porose areas, distinctly separate, and less pear-shaped; shield of the general shape of *D. venustus*, a little more narrow, fully as long as broad, coarsely punctate on sides, much more minutely in middle and behind.

Length of female shield, 1.5 mm.

Specimens from Mountain Home, Idaho; Prescott, and Olympia, Washington.

Close to *D. venustus*, but in the male the stigmal plate (fig. 12, upper figure) has the projection pointing more backward, and in the female (fig. 12, lower figure) the projection is more obliquely upturned. Smaller than *D. venustus*, and with less white, especially noticeable in the male.

Another new tick adds a genus to our fauna; it is the following:

Aponomma inornata, n. sp.

Dark mahogany-brown, unmarked; legs paler reddish brown. Body about one and two-thirds as long as broad, as broad behind as in front, surface minutely striate and more coarsely wrinkled; three deep longi-



FIG. 12.—*Dermaconus modestus*: Stigmal plate of male above, of female below.

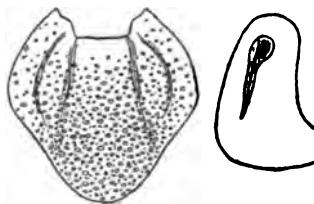


FIG. 13.—*Aponomma inornata*: Shield at left, stigmal plate at right.

tudinal furrows on posterior part of the dorsum, limited by a submarginal furrow; the festoons distinct. Shield (fig. 13) as broad as long, deeply emarginate in front, densely and deeply pitted, especially on the middle area, lateral carinae distinct, curved; no trace of eye-like spot. Capitulum (fig. 14) subtriangular, the porose areas rather elongate, separated by a narrow space. Legs of moderate length; coxae all small, coxa I with two subequal spines behind, others unarmed; tarsus I one and one-third longer than the preceding joint, in other

tarsi (see fig. 15) the basal part much shorter than the apical part, all tarsi tapering to the tip. Palpi slender, middle joint about twice as long as the apical joint. Stigmal plate (fig. 13) elongate, with a short, broad, dorsal prolongation, surface nearly smooth.

Length of female, 8 mm.; of shield, 1.5 mm.



FIG. 14.—*Aponomma inornata*: Capitulum.



FIG. 15.—*Aponomma inornata*: Tarsus IV.

Taken from a dog at Corpus Christi, Texas (Hooker); also from rabbit at Victoria, Texas (Mitchell).

The third species, described below, is an *Ixodes* related to *I. hexagonus*.

Ixodes texanus, n. sp.

Hard parts red-brown; shield rather yellowish in middle, legs paler reddish brown, rest of body lead-brown to black. Shield (fig. 16, at left) a little longer than broad, anterior sides rounded, posterior sides slightly concave, finely punctate, above the lateral parts

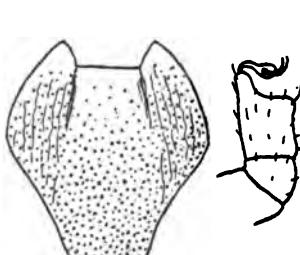


FIG. 16.—*Ixodes texanus*: Shield at left, tarsus IV at right.

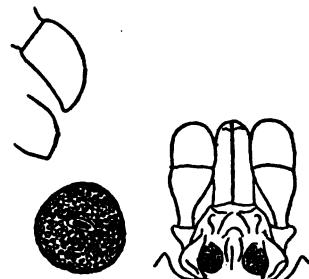


FIG. 17.—*Ixodes texanus*: Coxa I at left, above; stigmal plate at left, below; capitulum at right.

striate, no distinct lateral carinæ. Capitulum (fig. 17, at right) trapezoidal, strongly wrinkled above; porose areas nearly circular, well separated. Palpi short and broad. Abdomen, in engorged female, much elongate and posteriorly swollen. Legs short, tarsus I one and one-fourth times as long as preceding joint; all tarsi end abruptly, the joint being slightly swollen above before tip; coxa I (fig. 17, at left,

above) with a very short process, hardly a spine. Stigmal plate (fig. 17, at left, below) subcircular, quite strongly sculptured.

Length 6.5 mm. (swollen female); shield, 1 mm.

From a raccoon in Live Oak County, Texas (Mitchell and Bishopp).

This species will run to *I. hexagonus* in my table of *Ixodes* in the Revision of Ixodoidea, but it differs at once from that species in the abruptly-ending tarsi, as well as in minor points, as shape of porose areas, etc.

A CATALOGUE OF AMERICAN AQUATIC AND SEMI-AQUATIC HEMIPTERA.

By G. W. KIRKALDY, F.E.S., and J. R. DE LA TORRE BUENO.

As no catalogue of aquatic Hemiptera has been published for more than thirty years, the present list has been prepared for the use of our colleagues and ourselves. It was our intention at first to restrict it to the species of America north of Mexico, but the American regions and subregions are difficult to limit sharply, and so many northern workers visit the Antilles, Mexico, and even farther south, that we feel that a more comprehensive list will be at once scientific and convenient.

A large amount of material is in our hands for working up, and in due time we hope to replace this list by a critical synopsis of the American aquatic and semiaquatic Hemiptera.

In this list the references have been abridged so that they may be given complete for each genus and species. The genus under which each species has been described is given in parentheses following the name of the species. The numbers of the families, subfamilies, and genera are those in the senior author's List of Genera,^{*} such as are omitted being those that do not occur in our fauna. This catalogue is intended to include everything published before July 1, 1908.

The following works at least should be in the possession of every worker in aquatic forms in the Heteroptera:

BERGROTH, DR. E., AND BUENO, J. R. DE LA TORRE.

On the aquatic and semi-aquatic Hemiptera collected by Prof. James S. Hine in Guatemala. (First paper.) < Ohio Nat., VIII, pp. 370-382, figs. 1-5.

* See bibliography, p. 174.

BUENO, J. R. DE LA TORRE.

The genus *Notonecta* in America north of Mexico. < *Journ. N. Y. Ent. Soc.*, **xiii**, pp. 143-167, pl. 7 (1905).

The three *Ranatras* of the north-eastern United States. < *Can. Ent.*, **xxxvii**, pp. 187-188 (1905).

The cryptocerate Hemiptera of America in the writings of Professor Arnold L. Montandon. < *Proc. Ent. Soc. Wash.*, **viii**, pp. 45-58 (1906).

Diplonychus, Laporte (= *Hydrocyrius*, Spinola) and its relation to the other belostomatid genera. < *Can. Ent.*, **xxxix**, pp. 333-341 (1907).

CHAMPION, G. C.

Biologia Centrali-Americanana, Insecta Rhynchota, Hemiptera-Heteroptera, II, pp. 117-158 (1898), and pp. 338-383 (1900-1901), with pls. 8, 9, and 20-22.

DUFOUR, L.

Recherches anatomiques sur les Hémiptères. < *Mém. sav. étr. Ac. Sci. France*, **iv**, pp. 129, etc. (1833).

FIEBER, F. X.

Entomologische monographien. < *Abh. böhm. Ges. Wiss.* (v), 3, pp. 289-297, pls. 1-2 (pt.) (1844).

Genera Hydrocoridum. < *Abh. böhm. Ges. Wiss.* (v), 7, pp. 183-211, pls. 1-4 (1851).

Species generis Corisia. < *Abh. böhm. Ges. Wiss.* (v), 7, pp. 213-260, pls. 1-2 (1851).

HAHN, C. W., and HERRICH-SCHÄFFER, G. A. W.

Die wanzenartigen insekten. 9 vols., 324 plates, Nürnberg (1831-1853).

HEYMONS, R.

Beiträge zur morphologie und entwickelungsgeschichte der Rhynchothen. < *Nov. Act. Leop. Car. Ak. Nat.*, Halle, **LXXIV**, pp. 349-456, pls. 15-17 (1890).

KIRKALDY, G. W.

Revision of the Notonectidae. Part I. Introduction, and systematic revision of the genus *Notonecta*. < *Trans. Ent. Soc. Lond.*, 1897, pp. 393-426.

The stridulating organs of waterbugs, especially of Corixidae. < *Journ. Quckett Micr. Club* (2), **viii**, pp. 33-46, pls. 3-4 (1901).

A guide to the study of British waterbugs. < *Entomologist*, **xxxI**, pp. 177, and serially to the year 1906, 2 plates (1898-1908).

Über Notonectiden. < *Wiener Ent. Zeit.*, **xxIII**, pp. 93-135 (1904).

List of the genera of the pagiopodous Hemiptera-Heteroptera, etc. < *Trans. Am. Ent. Soc.*, **xxxII**, pp. 117-156 (1906).

MAYR, G.

Die Belostomiden. < *Verh. zool.-bot. Ges. Wien*, **xxI**, pp. 399-440 (1871).

MONTANDON, A. L. (See List of works by Bueno.)

REUTER, O. M.

Species palæarcticæ generis *Acanthia* Fabr., Latr. < Act. Soc. Sci.

Fenn., XXI, No. 2, pp. 1-58, pl. 1 (1895).

STRÅL, C.

Enumeratio Hemipterorum, v. < Svensk. Vet.-Ak. Handl., 14, No. 4 (1876).

UHLER, P. R. (See List of works by Henshaw, Psyche, x, pp. 31-34 and 123-125, 1903.)

WHITE, F. B.

Notes on Corixa. < Ent. Mo. Mag., x, pp. 60-63, 75-80 (1873).

Report on the pelagic Hemiptera. < Rep. Challenger, Zool., VII, pt. 19, pp. 1-82, pls. 1-3 (1883).

Division A. PAGIOPODA.

Family 6. ACANTHIIDÆ.

Saldidae, Lethierry et Severin.

Subfamily 1. ACANTHIINÆ.

Genus 1. ACANTHIA Fabricius.

1775, Syst. Ent., p. 693.

Acanthie Latreille, 1825.

Salda of many authors.

abdominalis (*Salda*) Champion, 1900, Biol. C.-Am., Hem.-Het., II, p. 339, pl. 20, fig. 10.

Habitat: Guatemala.

andensis (*Acanthia*) Distant, 1893, Trans. Ent. Soc. Lond., p. 93; (*Whymper's Trav. Gt. Andes*, app., p. 118, fig., 1892; not described).

Habitat: Ecuador.

anthracina (*Salda*) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 438.

Habitat: New York; Pennsylvania.

araucanica (*Acanthia*) Kirkaldy, 1899, Rev. d'Ent., XVIII, p. 93.

Habitat: Chile.

argentina (*Salda*) Berg, 1879, Hem. Arg., p. 293.

Habitat: Argentina.

bouchervillei (*Sciodopterus*) Provancher, 1872, Nat. Canad., IV, p. 106, and 1886, Faune Ent. Can., III, p. 192.

Habitat: Canada.

chilensis (*Acanthia*) Blanchard, 1852, Gay's Chile, Zool., VII, p. 225, Hem. pl. 2, fig. 15.

Habitat: Chile.

comata (*Salda*) Champion, 1900, Biol. C.-Am., Hem.-Het., II, p. 338, pl. 20, fig. 6.

Habitat: Mexico.

confluenta (Acanthia) Say, 1832, Descr. Het. Hem., p. 35 (Fitch reprint, p. 805).
confluens LeConte, 1859, Compl. Wtgs. Say, I, p. 361.
Habitat: Ontario; New York; New Jersey; Illinois; Michigan; Texas.

coriacea (Salda) Uhler, 1872, Fifth Rept. U. S. Geol. Surv., p. 421.
Habitat: British Columbia; Mackenzie R.; Winnipeg, Manitoba; Quebec; Massachusetts; New Jersey; Pennsylvania; Illinois; Colorado; Utah.

coxalis (Salda) Stål, 1873, Svensk. Vet.-Ak. Handl., xi, No. 2, p. 149.
Habitat: Cuba.

crassicornis (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 438.
Habitat: Saskatchewan.

deplanata (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 442.
Habitat: Saskatchewan; "Assiniboina;" Mackenzie R.; Ontario; Quebec; Maine; New Hampshire; Massachusetts; New York; New Jersey; Maryland; Illinois; Michigan; Minnesota; Iowa; Missouri; Kansas; Texas; New Mexico.

dispersa (Salda) Uhler, 1893, Proc. Ent. Soc. Wash., II, p. 383.
Habitat: Colorado; Utah.

elongata (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 448.
Habitat: British Columbia.

explanata (Salda) Uhler, 1893, Proc. Ent. Soc. Wash., II, p. 383.
Habitat: Utah.

hirta (Acanthia) Say, 1832, Descr. Het. Hem., p. 34 (Fitch reprint, p. 804); 1859, Compl. Wtgs., I, p. 359.
Habitat: Indiana.

humilis (Acanthia) Say, 1832, Descr. Het. Hem., p. 35 (Fitch reprint, p. 805); 1859, Compl. Wtgs., I, p. 360.
Habitat: Ontario; Maine; Massachusetts; Rhode Island; New York; New Jersey; Pennsylvania; Maryland; District of Columbia; North Carolina; Georgia; Florida; Illinois; Texas; Colorado; California; Cuba; St. Vincent; Grenada.

interstitialis (Acanthia) Say, 1825, Journ. Ac. Nat. Sci. Phila., IV, p. 324; 1859, Compl. Wtgs., II, p. 248.
Habitat: British Columbia; Maine; Massachusetts; New York; New Jersey; Maryland; Illinois; Michigan; Missouri; Nebraska; Texas; Colorado; New Mexico; California; Cuba; Haiti.

laevis (Salda) Champion, 1900, Biol. C.-Am., Hem.-Het., II, p. 339, pl. 20, fig. 3.
Habitat: Guatemala.

laticollis (Acanthia) Reuter, 1875, Pet. Nouv. Ent., p. 544; 1879, Cf. Finsk. Vet. Förh., XXI, p. 61.
Habitat: Alaska.

ligata (Acanthia) Say, 1832, Descr. Het. Hem., p. 34 (Fitch reprint, p. 804); 1859, Compl. Wtgs., I, p. 359.

variegata (Salda) Provancher, 1872, Nat. Canad., IV, p. 107.

Habitat: Winnipeg, Manitoba; Ontario; Quebec; Maine; Massachusetts; New York; Maryland; North Carolina; Indiana; Illinois; Minnesota; Iowa; Nebraska.

littoralis (Cimex) Linnæus, 1758, Syst. Nat., Ed. x, p. 442; Reuter, 1895, Act. Soc. Sci. Fenn., XXI, pt. 2, p. 8.

Habitat: ? Canada; ? Illinois; ? Utah.

luctuosa (Salda) Stål, 1859, Eugenie's Resa, Ins., p. 263.

Habitat: California.

lugubris (Acanthia) Say, 1832, Descr. Het. Hem., p. 34 (Fitch reprint, p. 804); 1859, Compl. Wtgs., I, p. 360.

Habitat: Ontario; Maine; Massachusetts; Rhode Island; New York; Pennsylvania; Maryland; Illinois; Michigan; Wisconsin; Missouri; Texas; New Mexico.

major (Salda) Provancher, 1872, Nat. Canad., IV, p. 107, and 1886, Faune Ent. Canad., III, p. 190.

Habitat: Canada.

obscura (Salda) Provancher, 1872, Nat. Canad., IV, p. 107; 1886, Faune Ent. Canad., III, p. 190.

Habitat: Canada.

opacipennis (Salda) Champion, 1900, Biol. C.-Am., Hem.-Het., II, p. 338, pl. 20, fig. 5.

Habitat: Mexico.

opacula (Salda) Zetterstedt, 1838, Ins. Lapp., p. 268; Reuter, 1895, Act. Soc. Sci. Fenn., XXI, pt. 2, p. 19, pl. 1, fig. 7.

Habitat: Massachusetts. (Also Europe and Siberia.)

orbiculata (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 450.

Habitat: Massachusetts; New York; Pennsylvania; Illinois; Texas; California.

pallipes (Acanthia) Fabricius, 1794, Ent. Syst., IV, p. 17; Reuter, 1895, Act. Soc. Sci. Fenn., XXI, pt. 2, p. 21.

Habitat: Ottawa, Ontario; Quebec; Sitka, Alaska; Connecticut; New Jersey; Maryland; Colorado; New Mexico; Utah; California; Cuba; Santo Domingo.

pellita (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 433.

Habitat: Massachusetts.

polita (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 441.

Habitat: Colorado; California.

quadrimaculata (Salda) Champion, 1900, Biol. C.-Am., Hem.-Het., II, p. 339, pl. 20, fig. 8.

Habitat: Panama.

reperta (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., III, p. 447.

Habitat: Ontario; Massachusetts; New York; New Jersey.

rogeri (Acanthia) Kirkaldy, 1899, Rev. d'Ent., xviii, p. 92.

Habitat: Chile.

saltatoria (Cimex) Linnæus, 1758, Systema Naturæ, Ed. x, p. 448;

Reuter, 1895, Act. Soc. Sci. Fenn., xxi, pt. 2, p. 15, pl. 2, fig. 6.

Habitat: British Columbia; Maine; New York; Illinois; Nebraska; (Sitka, Alaska?); Guatemala. (Also Europe and Siberia.)

scotica (Salda) Curtis, 1835, Brit. Ent., xii, p. 548; Reuter, 1895, Act. Soc. Sci. Fenn., xxi, pt. 2, p. 12.

Habitat: Illinois; Utah. (Also Europe and Siberia.)

separata (Salda) Uhler, 1878, Proc. Bost. Soc. Nat. Hist., xix, p. 432.

Habitat: Western Canada; New Hampshire; Massachusetts; Pennsylvania.

signoretii (Salda) Guérin, 1856, in Sagra's Hist. Cuba, pt. 2, vii, p. 167; viii, Articulata (Insecta), pl. 13, fig. 10.

ornata (Salda) Stål, 1862, Stett. Ent. Zeit., xxiii, p. 458.

Habitat: Massachusetts; New York; New Jersey; Maryland; North Carolina; Georgia; Kansas; Texas; Mexico; Cuba.

sphacelata (Salda) Uhler, 1877, Bul. U. S. Geol. Surv., iii, p. 434.

Habitat: Massachusetts; New Jersey; Maryland; Texas.

stellata (Acanthia) Curtis, 1835, Ross's Second Voy., App., p. LXXV.

Habitat: North American arctic regions.

sulcicollis (Salda) Champion, 1900, Biol. C.-Am., Hem.-Het., ii, p. 338, pl. 20, fig. 4.

Habitat: Mexico; Guatemala; Costa Rica; Panama.

tropicalis (Salda) Champion, 1900, Biol. C.-Am., Hem.-Het., ii, p. 338, pl. 20, fig. 7.

Habitat: Guatemala; Panama.

ventralis (Salda) Stål, 1860, Svensk. Vet.-Ak. Handl., 2, No. 7, p. 81.

Habitat: Guatemala; Panama; Brazil.

rubromaculata (Salda) Heidemann, 1901, Proc. Wash. Ac. Sci., iii, p. 368.

Habitat: Galapagos Islands (Ecuador). /

Genus 2. SALDOIDA Osborn.

1901, Can. Ent., xxxiii, p. 181.

slossoni Osborn, 1901, Can. Ent., xxxiii, p. 181.

Habitat: Florida.

cornuta Osborn, 1901, Can. Ent., xxxiii, p. 182.

Habitat: Florida.

Family 7. OCHTERIDÆ.

Pelagonidae of some authors.

Genus 1. OCHTERUS Latreille.

1807, Gen. Crust. et Ins., III, p. 142.

Pelagonus Latreille, 1809, Gen. Crust. et Ins., IV, p. 384.*Peleponus* Laporte de Castelnau, 1832, Essai Hém., pp. 6, 13.*acutangulus* (*Pelagonus*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, pp. 345, 346, pl. 20, figs. 15, 15a.

Habitat: Guatemala.

seneifrons (*Pelagonus*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, pp. 344, 345, pl. 20, figs. 12, 13.*marginatus* (*Pelagonus*) Uhler, 1893, Proc. Zool. Soc. Lond., p. 706, and 1894, p. 222, in part (not Latreille).

Habitat: Mexico; Guatemala; Panama; St. Vincent; Grenada; Trinidid.

americanus (*Pelagonus*) Uhler, 1876, Bul. U. S. Geol. and Geog. Surv., I, p. 335.

Habitat: Massachusetts; New York; New Jersey; Pennsylvania; Maryland; North Carolina; Illinois; Nebraska; Texas; Arizona.

perboscii (*Pelagonus*) Guérin, 1843, Rev. Zool., p. 113; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 20, fig. 11.*marginatus* (*Pelagonus*) Uhler, 1893, Proc. Zool. Soc. Lond., p. 706, and 1894, p. 222 (in part) (not Latreille).

Habitat: Mexico; Cuba; St. Vincent; Grenada.

splendidulus (*Pelagonus*) Montandon, 1898, Bul. Mus. Hist. Nat. Paris, No. 2, p. 73.

Habitat: Ecuador.

victor (*Peleponus*) Bolivar, 1879, An. Soc. Espa  . Hist. Nat., VIII, p. 144.

Habitat: Ecuador.

viridifrons (*Pelagonus*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, pp. 345, 346, pl. 20, fig. 14.

Habitat: Guatemala.

Genus 2. PELORIDIUM Breddin.

1897, Hamb. Magalh. Sammelsreis, Hem., p. 12.

Nordenskjoeldiella Haglund, 1899, Svensk. Exped. Magalh., II, p. 176.*hammoniorum* (*Peloridium*) Breddin, 1897, Hamb. Magalh. Sammelsreis, Hem., p. 12, fig. 4.*insignis* (*Nordenskjoeldiella*) Haglund, 1899, Svensk. Exped. Magalh., II, p. 176.

Habitat: Tierra del Fuego, Navarin Isl.

Family 8. NERTHRIDÆ.

Galgulidæ, formerly.*Gelastocoridæ*, Kirkaldy, Champion, Bueno.

Subfamily I. GELASTOCORINÆ.

Genus I. GELASTOCORIS Kirkaldy.

1897, Entomologist, xxx, p. 258.*

Galgulus Latreille, 1802, Hist. Nat. Ins., III, p. 253.

bufo (*Galgulus*) Herrich-Schäffer, 1840, Wanz. Ins., v, p. 288, pl. 184, fig. 536; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 20, figs. 16, 17, 17a.

Habitat: Mexico; Guatemala; Costa Rica.

flavus (*Galgulus*) Guérin, 1844, Iconographie, Ins., p. 351, pl. 57, fig. 4.

Habitat: Costa Rica; Panama; Brazil; Peru; Bolivia.

nebulosus (*Galgulus*) Guérin, 1844, Iconographie, Ins., p. 351.

Habitat: Brazil; Bolivia; Argentina.

oculatus (*Naucoris*) Fabricius, 1798, Ent. Syst. Suppl., p. 525; Lügger, 1900, Sixth Ann. Rept. Ent. Minn., p. 23, fig. 16.

Habitat: New York; New Jersey; Pennsylvania; District of Columbia; Maryland; North Carolina; Ohio; Illinois; Michigan; Minnesota; Tennessee; "Indian Territory;" Colorado; Arizona.^b

pulcher (*Galgulus*) Stål, 1854, Ofv. Vet.-Ak. Förh., xi, p. 239.

Habitat: Mexico.

quadrimaculatus (*Galgulus*) Guérin, 1844, Iconographie, Ins., p. 351.

Habitat: Brazil; Bolivia.

stålii Bueno (n. nom.).

nebulosus (*Galgulus*) var. *b.*, Stål, 1876, Svensk. Vet.-Ak. Handl., 14, No. 4, p. 137.

Habitat: Brazil.

rotundatus (*Gelastocoris*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p. 347, pl. 20, fig. 18.

Habitat: Mexico; Guatemala.

* In this genus all the species have been revived, as it is nearly certain that, being described by color characters only, many species have been confused, and until a revision of the genus is made it will not be possible to be absolutely sure of any synonymy in the group.

^b The species is stated by various authors to be found in the following places, but the localities appear doubtful, at best, to the authors: Texas; Mexico; Guatemala; Honduras; Nicaragua; Costa Rica; Panama. Uhler also cites Lower California, but he is manifestly in error, as the insect from the West Coast is absolutely different from that from the type locality, Carolina. Brazil and Bolivia are also cited, but not accepted by us.

variegatus (*Galculus*) Guérin, 1844, *Iconographie, Ins.*, p. 352; Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, pl. 20, figs. 19, 20.

Habitat: Mexico; Guatemala; Costa Rica; Panama.*

vicinus (*Gelastocoris*) Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, p. 349.

Habitat: Mexico; Guatemala; Nicaragua; Costa Rica; Panama to Brazil.

Subfamily 2. *NERTHRINÆ.*

Mononychiae Montandon.

Monychia Stål.

Genus 1. *MONONYX* Laporte de Castelnau.

1832, *Essai Hém.*, pp. 15, 16.

Phintius Stål, 1861, *Öfv. Vet.-Ak. Förh.*, XVIII, p. 201.

amplicollis (*Mononyx*) Stål, 1854, *Öfv. Vet.-Ak. Förh.*, XI, p. 239.

Habitat: Costa Rica; Colombia; Venezuela; Ecuador; Bolivia.

fuscipes (*Mononyx*) Guérin, 1843, *Rev. Zool.*, p. 114.

badius (*Mononyx*) Herrich-Schäffer, 1849, *Wanz. Ins.*, IX, p. 27, fig. 894.

obscurus (*Mononyx*) Stål, 1854, *Öfv. Vet.-Ak. Förh.*, XI, p. 239.

raptorius (*Mononyx*) Uhler, 1894, *Proc. Zool. Soc. Lond.*, p. 223 (not Fabricius).

Habitat: California; Mexico; British Honduras; Guatemala; Nicaragua; Costa Rica; Panama; Grenada; Colombia.

latus (*Mononyx*) Montandon, 1899, *Bul. Soc. Sci. Buc.*, VIII, p. 399.

Habitat: Colombia; Ecuador; Peru; Bolivia.

nepaeformis (*Naucoris*) Fabricius, 1775, *Syst. Ent.*, p. 693.

raptorius (*Mononyx*) Burmeister, 1835, *Handbuch*, II, p. 201.

bipunctatus (*Mononyx*) Stål, 1854, *Öfv. Vet.-Ak. Förh.*, XI, p. 239; Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, pl. 20, figs. 27, 27a.

Habitat: Mexico; Guatemala; Costa Rica; Antigua; Colombia; Guianas; Brazil; Bolivia; Argentina.

parvulus (*Mononyx*) Signoret, 1864, *Ann. Soc. Ent. France*, (4), IV, p. 588.

Habitat: Chile.

peruvianus (*Mononyx*) Montandon, 1905, *Ann. Mus. Nat. Hung.*, III, p. 403.

Habitat: Peru.

* Other localities given are: South Carolina; Georgia; Florida; Texas; Cuba; Amazon R. (Brazil), and Argentina. All these are based on the misidentification of undescribed species. Uhler gives California as another region inhabited by this bug, but his form has been seen by the authors and is an undescribed species.

raninus (Mononyx) Herrich-Schäffer, 1849, Wanz. Ins., ix, p. 28, pl. 291, fig. 896.

Habitat: Colombia; Venezuela; Brazil; Paraguay; Argentina.

raptorius (Naucoris) Fabricius, 1803, Syst. Rhyn., p. 111; Champion, 1901, Biol. C.-Am., Hem.-Het., ii, pl. 20, figs. 27, 27a.

fuscoconspersus (Mononyx) Stål, 1860, Svensk. Vet.-Ak. Handl., ii, No. 7, p. 82.

Habitat: Mexico; Panama; Grenada; Colombia; Dutch Guiana; Brazil; Paraguay; Argentina.

Genus 2. **MATINUS** Stål.

1861, Öfv. Vet.-Ak. Förh., xviii, p. 201.

americanus (Matinus) Montandon, 1905, Ann. Mus. Nat. Hung., iii, p. 404.

Habitat: Brazil.

Genus 4. **NERTHRA** Say.

1832, Desc. Het. Hem., p. — (Fitch reprint, p. 809); 1859, Compl. Wtgs., i, p. 363.

stygica (Naucoris) Say, 1832, Desc. Het. Hem., p. — (Fitch reprint, p. 808); 1859, Compl. Wtgs., i, p. 364; Bueno, 1905, Ohio Nat., v, p. 288, fig. 1.

Habitat: Georgia; Florida.*

Family 9. **NAUCORIDÆ.**

Subfamily 3. **NAUCORINÆ.**

Genus 1. **LIMNOCORIS** Stål.

1860, Svensk. Vet.-Ak. Handl., ii, No. 7, p. 83.

Borborocoris Stål, 1861, Öfv. Vet.-Ak. Förh., xviii, p. 202.

bergrothi (Limnocoris) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 416, 420.

Habitat: Venezuela.

borellii (Limnocoris) Montandon, 1897, Boll. Mus. Zool. Anat. Comp. Torino, XII, No. 279, p. 3.

Habitat: Bolivia.

bouvieri (Limnocoris) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 415, 418.

Habitat: Colombia.

* Also recorded by Uhler (Hem. Lower Cal.) as occurring in the Western United States. This is erroneous, the insects we have seen labelled *Nerthra* being one or another species of *Mononyx*.

dubiosus (*Limnocoris*) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 416, 422.

Borborocoris pallescens Signoret, MS.

Habitat: Martinique; Colombia; Chile.

horvathi (*Limnocoris*) Montandon, 1900, Termész. Füz., xxiii, p. 420.

Habitat: Peru.

inornatus (*Limnocoris*) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 417, 423; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 14.

Habitat: Guatemala.

insignis (*Naucoris*) Stål, 1860, Svensk. Vet.-Ak. Handl., II, No. 7, p. 83.

Habitat: Brazil.

insularis (*Limnocoris*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p. 359, pl. 21, fig. 16 (from type).

Habitat: Honduras.

maculiceps (*Limnocoris*) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 417, 424.

Habitat: Brazil.

obscurus (*Limnocoris*) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 416, 419.

Habitat: Colombia.

ochraceus (*Limnocoris*) Montandon, 1898, Verh. zool.-bot. Ges. Wien, XLVIII, pp. 416, 421.

Habitat: Colombia.

ovatulus (*Limnocoris*) Montandon, 1897, Boll. Mus. Zool. Anat. Comp. Torino, XII, No. 297, p. 5.

Habitat: Argentina.

pallescens (*Borborocoris*) Stål, 1861, Öfv. Vet.-Ak. Förh., xviii, p. 202.

Habitat: Colombia; Venezuela.

pauper (*Limnocoris*) Montandon, 1897, Boll. Mus. Zool. Anat. Comp. Torino, XII, No. 297, p. 5.

Habitat: Brazil.

pectoralis (*Limnocoris*) Montandon, 1897, Boll. Mus. Zool. Anat. Comp. Torino, XII, No. 297, p. 6.

Habitat: Peru; Argentina.

profundus (*Naucoris*) Say, 1832, Descr. Het. Hem., p. — (Fitch reprint, p. 809); 1859, Compl. Wtgs., I, p. 363.

Habitat: Mexico.

pusillus (*Limnocoris*) Montandon, 1897, Boll. Mus. Zool. Anat. Comp. Torino, XII, No. 297, p. 8.

Habitat: Brazil.

signoreti (*Limnocoris*) Montandon, 1897, Boll. Mus. Zool. Anat. Comp. Torino, XII, No. 297, p. 5.

Habitat: Mexico.

stali (*Limnocoris*) Montandon, 1897, *Boll. Mus. Zool. Anat. Comp.* Torino, XII, No. 297, p. 4; Champion, 1901, *Biol. C.-Am., Hem.-Hes.*, II, pl. 21, fig. 12 (from type).

profundus (*Naucoris*) Stål, 1860, *Svensk. Vet.-Ak. Handl.*, II, No. 7, p. 83 (not Say).

Habitat: Guatemala; Colombia; Venezuela; Bolivia.

virescens (*Limnocoris*) Montandon, 1897, *Boll. Mus. Zool. Anat. Comp.* Torino, XII, No. 297, p. 7; Champion, 1901, *Biol. C.-Am., Hem.-Hes.*, II, pl. 21, fig. 15.

Habitat: Mexico; Costa Rica.

volxemi (*Borborocoris*) Lethierry, 1877, *Ann. Soc. Ent. Belg.*, XX, p. 41. Habitat: South America. (Wrongly attributed to Portugal.)

Genus 5. HELEOCORIS Stål.

1876, *Svensk. Vet.-Ak. Handl.*, XIV, No. 4, p. 142.

spinipes (*Heleocoris*) Montandon, 1897, *Verh. zool.-bot. Ges. Wien*, XLVII, p. 447.

Habitat: Brazil.

Genus 9. PELOCORIS Stål.

1876, *Svensk. Vet.-Ak. Handl.*, XIV, No. 4, p. 142.

binotulatus (*Naucoris*) Stål, 1860, *Svensk. Vet.-Ak. Handl.*, II, No. 7, p. 83.

Habitat: Panama; Brazil; Argentina.

bipunctulus (*Naucoris*) Herrich-Schäffer, 1849, *Wanz. Ins.*, IX, p. 39, pl. 293, fig. 900.

Habitat: Brazil.

carolinensis (*Pelocoris*) Bueno, 1907, *Can. Ent.*, XXXIX, p. 227.

Habitat: North Carolina; South Carolina; Florida.

femoratus (*Naucoris*) Palisot de Beauvois, 1805, *Ins. rec. Afr. Am.*, p. 237, pl. 20, fig. 4.

poeyi (*Naucoris*) Guérin, 1844, *Iconographic, Ins.*, p. 352, pl. 57, fig. 5.

Habitat: Canada; Massachusetts; New York; New Jersey; Pennsylvania; Maryland; "Carolina"; Florida; Illinois; Michigan; Wisconsin; Minnesota; Tennessee; Louisiana; Mexico; Guatemala; Panama; Cuba; Jamaica; St. Barthélémy; Guadeloupe; Grenada; Colombia; Venezuela; Uruguay.*

* Here again we have a distribution too extensive and too scattered to be real. The species of the genus are so similar in coloration that the description of one can apply to several. Consequently, any other localities than those north of Mexico and on the Atlantic seaboard should be regarded as open to question, at least for the present.

horvathi (*Pelocoris*) Montandon, 1905, Ann. Mus. Nat. Hung., III, p. 504.
 Habitat: Brazil.

impicticollis (*Pelocoris*) Stål, 1876, Svensk. Vet.-Ak. Handl., XIV, No. 4, p. 144.
 Habitat: Brazil.

lautus (*Pelocoris*) Berg, 1879, Hem. Arg., p. 188.
 Habitat: Argentina.

magister (*Pelocoris*) Montandon, 1898, Bull. Soc. Sci. Buc., VII, p. 289.
 Habitat: Brazil.

minutus (*Pelocoris*) Montandon, 1895, Boll. Mus. Zool. Anat. Comp. Torino, X, No. 219, p. 9.
 Habitat: Paraguay.

nigriculus (*Pelocoris*) Berg, 1879, Hem. Arg., p. 188.
 Habitat: Argentina.

nitidus (*Pelocoris*) Montandon, 1898, Bull. Soc. Sci. Buc., VII, p. 287.
 Habitat: Panama; Venezuela; Brazil.

politus (*Pelocoris*) Montandon, 1895, Boll. Mus. Zool. Anat. Comp. Torino, X, No. 219, p. 8.
 Habitat: Paraguay; Argentina.

procurrens (*Pelocoris*) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 489.
 Habitat: Brazil.

subflavus (*Pelocoris*) Montandon, 1898, Bull. Soc. Sci. Buc., VII, p. 288.
 Habitat: Brazil.

Genus 14. CRYPTOCRICOS Signoret.

1850, Rev. Mag. Zool., p. 289.
Cryptocricus Mayr, 1866, Novara Exped., Hem., p. 182.
Cryptocricus Stål, 1876, Svensk. Vet.-Ak. Handl., XIV, No. 4, p. 141.

barozzi (*Cryptocricos*) Signoret, 1850, Rev. Mag. Zool., p. 290, pl. 4, fig. 10.
 Habitat: Brazil; Chile.

macrocephalus (*Cryptocricus*) Montandon, 1897, Bull. Mus. Hist. Nat. Paris, No. 4, p. 124; Champion, 1901, Biol. C.-Am., Hem.-Hét., II, pl. 21, figs. 2, 2a, 2b.
 Habitat: Mexico; Guatemala.

Genus 16. AMBRYSUS Stål.

1862, Stett. Ent. Zeit., XXIII, p. 459.

acutangulus (*Ambrysus*) Montandon, 1897, Bull. Mus. Hist. Nat. Paris, No. 4, p. 126.
 Habitat: Argentina.

attenuatus (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 7, 11.
 Habitat: Brazil.

bergi (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, p. 19.
 Habitat: Argentina.

californicus (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, p. 18.
 Habitat: Mexico (Lower California).

crenulatus (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 11, 13.
 Habitat: Colombia.

fraternus (*Ambrysus*) Montandon, 1897, Bull. Mus. Hist. Nat. Paris, No. 4, p. 127.
 Habitat: Brazil.

fucatus (*Ambrysus*) Berg, 1879, Hem. Arg., p. 187.
 Habitat: Argentina.

géayi (*Ambrysus*) Montandon, 1897, Bull. Mus. Hist. Nat. Paris, No. 4, p. 127.
 Habitat: Panama.

guttatipennis (*Ambrysus*) Stål, 1876, Svensk. Vet.-Ak. Handl., XIV, No. 4, p. 143; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 10.
 Habitat: Mexico.

hybridus (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 13, 22; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 9.
 Habitat: Mexico.

melanopterus (*Ambrysus*) Stål, 1862, Stett. Ent. Zeit., XXIII, p. 460; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 7.
 Habitat: Texas; Arizona; Mexico; Costa Rica.

mexicanus (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 13, 21; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 8.
 Habitat: Mexico.

oblongulus (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 11, 14; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 3.
 Habitat: Costa Rica; Panama.

obscuratus (*Ambrysus*) Montandon, 1898, Bull. Soc. Sci. Buc., VII, p. 382.
 Habitat: Brazil.

parviceps (*Ambrysus*) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 12, 17; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 6.
 Habitat: Mexico; Brazil.

poeyi (Naucoris) Amyot et Serville, 1843, Hist. Nat. Hém., p. 434, pl. 8, fig. 5.

signoreti (Ambrysus) Stål, 1862, Stett. Ent. Zeit., xxiii, p. 460.
Habitat: Colorado; New Mexico; Arizona; Mexico.

pudicus (Ambrysus) Stål, 1862, Stett. Ent. Zeit., xxiii, p. 460; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 5.
Habitat: California; Wyoming; Mexico.

pulchellus (Ambrysus) Montandon, 1897, Verh. zool.-bot. Ges. Wien, XLVII, pp. 11, 16; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, figs. 4, 4a.
Habitat: Mexico; Guatemala.

puncticollis (Ambrysus) Stål, 1876, Svensk. Vet.-Ak. Handl., xiv, No. 4, p. 143.
Habitat: Texas; Arizona.

Family 10. BELOSTOMATIDÆ.

Belostomidae of authors.

Nepidae of authors, in part.

Genus 1. BENACUS Stål.

1862, Öfv. Vet.-Ak. Förh., xix, p. 205.

Belostoma of authors (not Latr.) in part.

griseus (Belostoma) Say, 1832, Descr. Het. Hem., p. 39 (Fitch reprint, p. 809); 1859, Compl. Wtgs., I, p. 365; Riley, 1895, Proc. Ent. Soc. Wash., III, p. 86, fig. 5.

haldemanus (Belostoma) Leidy, 1847, Journ. Acad. Nat. Sci. Phila., (2), I, p. 66.

impressus (Belostoma) Haldeman, 1853, Proc. Acad. Nat. Sci. Phila., VI, p. 364.

harpax (Belostoma) Stål, 1854, Öfv. Vet.-Ak. Förh., XI, p. 240.

ruficeps (Belostoma) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 382.

distinctum (Belostoma) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 382.

Habitat: New York; New Jersey; Pennsylvania; District of Columbia; West Virginia; North Carolina; Georgia; Florida; Ohio; Illinois; Michigan; Minnesota; Iowa; Missouri; Kentucky; Tennessee; Louisiana; Texas; Cuba.

angustatus (Belostoma) Guérin, 1856, in Sagra's Hist. Cuba, pt. 2, VII, p. 176.
Habitat: Cuba.

Genus a. *LETHOCERUS* Mayr.

1852, Verh. Zool.-bot. Ges. Wien, v, p. 17.

Amorgius Stål, 1865, Hem. Afr., III, p. 179.

Nepa Linnæus, 1758, Syst. Nat., Ed. x, p. 440 (in part).

Belostoma of authors (not Latreille).

Belostomum Burmeister, 1835, Handb. Ent., II, p. 195.

americanus (*Belostoma*) Leidy, 1847, Journ. Acad. Nat. Sci. Phila., VI, pp. 58, 66.

litigiosum (*Belostoma*) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 383.

griseum (*Belostoma*) Mayr, 1871, Verh. zool.-bot. Ges. Wien, VIII, p. 427 (in part).

Habitat: Quebec; Maine; Massachusetts; Connecticut; New York; New Jersey; Pennsylvania; Virginia; Ohio; Illinois; Michigan; Minnesota; Tennessee; Texas; Colorado.

angustipes (*Belostoma*) Mayr, 1871, Verh. zool.-bot. Ges. Wien, VIII, p. 427; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 22, figs. 5, 5a.

Habitat: California; Mexico.

annulipes (*Belostoma*) Herrich-Schäffer, 1846, Wanz. Ins., VIII, p. 28, pl. 258, figs. 803, 804; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 22, figs. 3, 3a.

ruficeps (*Belostoma*) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 382.

signoreti (*Belostoma*) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 382.

Habitat: Texas; Colorado; California; Mexico; British Honduras; Guatemala; Nicaragua; Costa Rica; Panama; Cuba; Jamaica; Colombia; Venezuela; Dutch Guiana; Brazil; Argentina.

camposi (*Amorgius*) Montandon, 1900, Bull. Soc. Sci. Buc., IX, p. 561.
Habitat: Ecuador.

collosicus (*Belostoma*) Stål, 1854, Öfv. Vet.-Ak. Förh., XI, p. 239.

colossicum (*Belostoma*) Stål, 1861, Öfv. Vet.-Ak. Förh., XVIII, p. 205; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 22, fig. 4.

Habitat: Mexico; Honduras; Costa Rica; Cuba; Jamaica.

curtus (*Belostoma*) Guérin, 1856, in Sagra's Cuba, pt. 2, VII, p. 175.

curtura (*Belostoma*) Uhler, 1886, Check List, p. 28.

Habitat: Cuba.

grandis (*Nepa*) Linnæus, 1758, Syst. Nat., Ed. x, p. 440.

Habitat: Colombia; French Guiana; Brazil.

mayri (*Belostoma*) Montandon, 1896, Ann. Soc. Ent. Belg., XL, p. 516.
Habitat: Brazil.

medius (*Belostoma*) Guérin, 1856, in Sagra's Cuba, pt. 2, vii, p. 175.

Habitat: Cuba.

obscurus (*Belostoma*) Dufour, 1863, Ann. Soc. Ent. France, (4), iii, p. 383.

griseum (*Belostoma*) Mayr, 1871, Verh. zool.-bot. Ges. Wien, xxii, p. 427 (in part).

americanum of authors (in part).

Habitat: Massachusetts; Connecticut; New York; New Jersey; Utah.

uhleri (*Belostoma*) Montandon, 1896, Ann. Soc. Ent. Belg., xl, p. 513; Howard, 1902, Insect Book, pl. xxix, fig. 25.

americanum (*Belostoma*) Uhler, 1876, Bul. U. S. Geol. and Geog. Surv. Terr., i, p. 71, pl. xxi, fig. 38.

Habitat: New Jersey; Pennsylvania; North Carolina; Florida; Wisconsin; Kansas; Louisiana.

Genus 3. **ABEDUS** Stål.

1862, Stett. Ent. Zeit., xxiii, p. 461.

Serphus Stål, 1862, Stett. Ent. Zeit., xxiii, p. 462.

Stenoscytus Mayr, 1863, Verh. zool.-bot. Ges. Wien, xiii, p. 341.

Pedinocoris Mayr, 1863, Verh. zool.-bot. Ges. Wien, xiii, p. 341.

Deinostoma Kirkaldy, 1897, Entomologist, xxx, p. 258.

breviceps (*Abedus*) Stål, 1862, Stett. Ent. Zeit., xxiii, p. 462; Champion, 1901, Biol. C.-Am., Hem.-Het., ii, pl. 21, figs. 20, 20a.

Habitat: Mexico; Costa Rica.

dilatatus (*Belostoma*) Say, 1832, Descr. Het. Hem., p. — (Fitch reprint, p. 810); 1859, Compl. Wtgs., i, p. 366; Champion, 1901, Biol. C.-Am., Hem.-Het., ii, pl. 21, figs. 18, 18a.

stollii (*Zaitha*) Herrich-Schäffer, Wanz. Ins., ix, p. 35, fig. 898 (not Dufour, 1863, Ann. Soc. Ent. France, (4), iii, p. 387).

Habitat: Arizona; California; Mexico.

identata (*Zaitha*) Haldeman, 1853, Proc. Ac. Nat. Sci. Phila., vi, p. 364.

brachonyx (*Pedinocoris*) Mayr, 1863, Verh. zool.-bot. Ges. Wien, xiii, p. 351, pl. 11, fig. 5.

Habitat: Arizona; California.

macronyx (*Pedinocoris*) Mayr, 1863, Verh. zool.-bot. Ges. Wien, xiii, p. 350, pl. 11, figs. 1-4; Champion, 1901, Biol. C.-Am., Hem.-Het., ii, pl. 21, fig. 22.

Habitat: Arizona; California; Mexico.

ovatus (*Abedus*) Stål, 1862, Stett. Ent. Zeit., xxiii, p. 462.

mexicanus (*Stenoscytus*) Mayr, 1863, Verh. zool.-bot. Ges. Wien, xiii, p. 347, pl. 11, figs. 6-10.

Habitat: Texas; New Mexico; Arizona; Mexico.

signoreti (Abedus) Mayr, 1871, Verh. zool.-bot. Ges. Wien, XXI, p. 404; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, fig. 21.
vicinus (Abedus) Mayr, 1871, Verh. zool.-bot. Ges. Wien, XXI, p. 405.

Habitat: Mexico; Guatemala; Costa Rica; Panama.

Genus 4. **BELOSTOMA** Latreille.

1807, Gen. Crust. Ins., III, p. 144.

Zaitha Amyot et Serville, 1843, Hist. Nat. Ins., Hém., p. 430.

Perthostoma Leidy, 1847, Journ. Acad. Nat. Sci. Phila., n. s., I, p. 59.

apache, n. nom (Kirkaldy).

minor (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 391.

aurantiaca Walker, 1873, Catalogue, VIII, p. 179 (in part).

Habitat: California; Mexico; Cuba; Brazil.

asiaticum (Zaitha) Mayr, 1863, Verh. zool.-bot. Ges. Wien, XIII, p. 354.

boops (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 388.

Habitat: Mexico; Brazil; Argentina; Peru; Chile.

aurantiacum (Perthostoma) Leidy, 1847, Journ. Acad. Nat. Sci. Phila., (2), I, p. 60.

lutaria (Zaitha) Stål, 1855, Öfv. Vet.-Ak. Förh., XII, p. 190.

Habitat: Rhode Island; New Jersey; North Carolina; Florida; Louisiana; Texas.

aurivillianum (Zaitha) Montandon, 1899, Bull. Mus. Hist. Nat. Paris, No. 4, p. 170.

Habitat: Colombia; Venezuela; Brazil.

bergi (Zaitha) Montandon, 1899, Bull. Mus. Hist. Nat. Paris, No. 4, p. 172.

Habitat: Argentina.

bifoveolatum (Belostoma) Spinola, 1852, Gay's Chile, Zool., VII, p. 227.

Habitat: Brazil; Paraguay; Chile.

boscii (Zaitha) Lepeletier et Serville, 1825, Enc. Méth., X, p. 273.

anurus (Diplonychus) Herrich-Schäffer, 1846, Wanz. Ins., VIII, p. 26, pl. 257, fig. 799.

cupreomicans (Zaitha) Stål, 1854, Öfv. Vet.-Ak. Förh., XI, p. 240.

subspinosa (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 387.

Habitat: Arizona; California; Mexico; Guatemala; Costa Rica; Panama; Cuba; Santo Domingo; Grenada; Colombia; Guiana (French); Brazil; Paraguay; Uruguay; Argentina.

dentatum (Belostoma) Mayr, 1863, Verh. zool.-bot. Ges. Wien, XIII, p. 356.

eumorpha (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 386.
 Habitat: Brazil; Argentina.

difficilis (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 391.
 Habitat: Venezuela; Dutch Guiana.

dilatum (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 387.
 Habitat: Brazil.

discretum (Belostoma) Montandon, 1903, Bull. Mus. Hist. Nat. Paris, No. 1, p. 22.
 Habitat: Brazil; Paraguay; Argentina.

elegans (Zaitha) Mayr, 1871, Verh. zool.-bot. Ges. Wien, XXI, p. 415.
 Habitat: Uruguay; Paraguay; Argentina.

ellipticum (Belostoma) Latreille, 1833, Ins., etc., in Humboldt et Bonpland (pt. 2), p. 105, pl. 39, fig. 4.
 Habitat: Texas; Mexico.

foveolatum (Zaitha) Mayr, 1863, Verh. zool.-bot. Ges. Wien, XIII, p. 355.
 Habitat: Guiana (French); Brazil; Paraguay; Argentina.

flumineum (Belostoma) Say, 1832, Desc. Het. Hem., p. — (Fitch reprint, p. 809); 1859, Compl. Wtgs., I, p. 364.

micrantula (Zaitha) Uhler, 1895, in Gillette and Baker, Hem. Col., Bul. 31, Colo. Agr. Exp. Sta., p. 63.*
 Habitat: Quebec; New York; New Jersey; Pennsylvania; District of Columbia; North Carolina; Georgia; Ohio; Indiana; Illinois; Michigan; Wisconsin; Tennessee; Louisiana; Colorado; Arizona.

fusciventris (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 389; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, figs. 23, 23a.
 Habitat: Arizona; Texas; New Mexico; California; Mexico; Guatemala; Honduras; Costa Rica.

gestroi (Belostoma) Montandon, 1900, Ann. Mus. Civ. Gen., (2), XX, (XL), p. 537.
 Habitat: Paraguay; Argentina.

martini (Zaitha) Montandon, 1899, Bull. Mus. Hist. Nat. Paris, No. 4, p. 170.
 Habitat: Patagonia.

mayri (Zaitha) Berg, 1884, Ad. et Em. ad Hem. Arg., p. 120.
eumorpha (Zaitha) Berg, 1879, Ann. Soc. Cient. Arg., VIII, p. 71 (not Dufour).
 Habitat: Venezuela; Guiana; Brazil; Bolivia; Argentina.

micantulum (Zaitha) Stål, 1860, Svensk. Vet.-Ak. Handl., (2), No. 7, p. 84.

* Original specimen seen and redetermined by J. R. T. B.

selotypus (Zaitha) F. B. White, 1879, Trans. Ent. Soc. Lond., p. 270.

minuscula (Zaitha) Uhler, 1882, Stand. Nat. Hist., II, p. 258.
Habitat: Brazil; Paraguay; Argentina.

minor (Nepa) Palisot de Beauvois, 1805, Ins. rec. Afr. Am., p. 236, Hém. pl. 20, fig. 3.
Habitat: Hayti (Santo Domingo).

noualhieri (Belostoma) Montandon, 1903, Bull. Mus. Hist. Nat. Paris, No. 1, p. 21.
Habitat: Brazil.

oxyurum (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 390.
Habitat: Brazil; Uruguay; Argentina.

plebejum (Zaitha) Stål, 1860, Svensk. Vet.-Ak. Handl., II, No. 7, p. 83.
maculosa (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 389.
limbata (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 390.
adusta (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 390.
(?) *micantula* (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 391.
Habitat: Brazil; Argentina.

pygmæum (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 391.
Habitat: Brazil; Argentina.

subspinosum (Nepa) Palisot de Beauvois, 1805, Ins. rec. Afr. Am., p. 236, Hém. pl. 20, fig. 2, a, b.
Habitat: Haiti (Santo Domingo).

stollii (Zaitha) Amyot et Serville, 1843, Hist. Nat. Ins., Hém., p. 430.
Habitat: French Guiana; Brazil; Chile.

testaceopallidum (Belostoma) Latreille, 1807, Gen. Crust. Ins., III, p. 145. (Type species of the genus.)
margineguttata (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 387.
carbonaria (Zaitha) Dufour, 1863, Ann. Soc. Ent. France, (4), III, p. 388.
stolli (Zaitha) Mayr, 1863, Verh. zool.-bot. Ges. Wien, XIII, p. 352.
Habitat: Guadeloupe; Brazil.

testaceum (Perthostoma) Leidy, 1847, Journ. Acad. Nat. Sci. Phila., n. s., I, p. 66.
reticulata (Zaitha) Haldeman, 1852, Stansb. Exped., p. 370.
Habitat: New York; New Jersey; Pennsylvania; District of Columbia; North Carolina; South Carolina; Michigan; Texas.

Genus 7. **DIPLONYCHUS** Laporte de Castelnau.1832, *Essai Hém.*, pp. 17, 18.*Hydrocyrius* Spinola, 1850, *Mem. Mat. Soc. Modena*, xxv, p. 146.*Ilyotrepes* Stål, 1853, *Öfv. Vet.-Ak. Förh.*, x, p. 264.*columbiæ* (*Hydrocyrius*) Spinola, 1850, *Mem. Mat. Soc. Modena*, xxv, p. 146.*herculeus* (*Ilyotrepes*) Stål, 1853, *Öfv. Vet.-Ak. Förh.*, x, p. 264.*algeriense* (*Belostoma*) Dufour, 1855, *Mem. Soc. Ac. Sci. Liège*, x, p. 187, pl. I, fig. I.*capitatum* (*Belostoma*) Guérin, 1856, in *Sagra's Cuba*, pt. 2, VII, p. 175.

Habitat: Mexico; Cuba.*

Family II. CORIXIDÆ.

Genus 2. **TENAGOBIA** Bergroth.1899, *Ent. Mo. Mag.*, xxxv, p. 282.*fuscata* (*Sigara*) Stål, 1859, *Eugenie's Resa, Ins.*, p. 268.

Habitat: Brazil.

seducta (*Sigara*) F. B. White, 1879, *Tr. Ent. Soc. Lond.*, p. 275.

Habitat: Brazil.

selecta (*Sigara*) F. B. White, 1879, *Tr. Ent. Soc. Lond.*, p. 273.

Habitat: Brazil.

signata (*Sigara*) F. B. White, 1879, *Tr. Ent. Soc. Lond.*, p. 274.

Habitat: Brazil.

simulans (*Sigara*) F. B. White, 1879, *Tr. Ent. Soc. Lond.*, p. 275.

Habitat: Brazil.

sobrina (*Sigara*) F. B. White, 1879, *Tr. Ent. Soc. Lond.*, p. 275.

Habitat: Brazil.

socialis (*Sigara*) F. B. White, 1879, *Tr. Ent. Soc. Lond.*, p. 274.

Habitat: California; Mexico; Guatemala; Panama; Grenada; Brazil.

Genus 5. **CALLICORIXA** F. B. White.1873, *Ent. Mo. Mag.*, x, p. 62.*griffinii* (*Corixa*) Kirkaldy, 1899, *Bull. Mus. Zool. Anat. Comp. Torino*, xiv, No. 350, p. 7, figs. 6-7.

Habitat: Ecuador.

* This genus is placed here in deference to the older authors, the records of the species being those given by Spinola and Guérin. But there are no other references to its American habitat in the literature, nor have either of the authors seen an American specimen.

kollarii (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 229, pl. 1, fig. 7; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 22, figs. 18, 18a, b, ♂.

cubæ Uhler, 1894, Proc. Zool. Soc. Lond., p. 224 (not Guérin).

Habitat: Alaska; Canada; Massachusetts; Pennsylvania; Florida; Texas; Mexico; Cuba; Jamaica; Grenada; Venezuela; Brazil; Ecuador; Bolivia.

præusta (*Corixa*) Fieber, 1848, Bull. Soc. Nat. Moscou (pt. 2), p. 521; Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, pl. 1, fig. 17 (Nos. 1-18).

Habitat: Alaska.

Genus 7. ARCTOCORIXA Wallengren.

1894, Ent. Tidskr., X, p. 133.

Glaenocorixa Puton, 1880, Syn. Hém. Hét. France, p. 234.

Basileocorixa Kirkaldy, 1898, Entomologist, XXX, p. 253.

Corixa Thomson, 1869, Opusc. Ent. Fasc., I, p. 27 (not Am. et Serv.).

Corixa F. B. White, 1873, Ent. Mo. Mag., X, p. 62 (not Geoffroy).

abdominalis (*Corixia*) Say, 1832, Descr. Het. Hem., p. 38 (Fitch reprint, p. 811); 1859, Complete Wtgs., I, p. 366.

bimaculata (*Corixa*) Guérin, 1844, Icon. Regne An., Ins., p. 354.

Habitat: Texas; California; Baja California; Guatemala.

acuminata (*Corixa*) Uhler, 1897, Trans. Md. Ac. Sci., I, p. 392.

Habitat: Illinois; Texas.

alternata (*Corixa*) Say, 1825, Journ. Acad. Nat. Sci. Phila., IV, p. 329; 1859, Compl. Wtgs., II, p. 251.

Habitat: Maine; New Hampshire; Illinois.

bilineata (*Corixa*) Provancher, 1872, Nat. Can., IV, p. 108.

Habitat: Canada.

bivittata (*Corixa*) Provancher, 1887, Pet. Faun. Ent. Can., III, p. 203.

Habitat: Canada.

burmeisteri (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 236.

Habitat: North America.

brimleyi (*Arctocorixa*) Kirkaldy, 1908, Can. Ent., XL, p. 120.

Habitat: North Carolina.

calva (*Corixia*) Say, 1832, Descr. Het. Hem., p. — (Fitch reprint, p. 810); 1859, Compl. Wtgs., I, p. 366.

Habitat: Unalaska; Canada; Maine; Massachusetts; Pennsylvania; Texas; Colorado.

convexa (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 249, pl. 2, fig. 23.

Habitat: Labrador.

cubæ (*Corixa*) Guérin, 1844, Icon. Regne An., Ins., p. 353, pl. 57, fig. 9.

Habitat: Cuba.

decolor (*Corixa*) Uhler, 1871, *Silliman's Amer. Journ. Sci.*, p. 106.
 Habitat: California.

desenconscripta (*Corixa*) Breddin, 1897, *Hamb. Magalh. Sammelr.*,
Hem., p. 16, fig. 7.
 Habitat: Paraguay; Argentina.

dispersa (*Corixa*) Uhler, 1875, *Rept. U. S. Geog. and Geol. Surv.*, 5,
 p. 841, pl. 42, fig. 7.
 Habitat: Texas; Nevada; California.

edulis (*Corixa*) Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, p. 380,
 pl. 21, fig. 24, ♂.
 Habitat: Mexico.

erichsonii (*Corixa*) Fieber, 1851, *Abh. böhm. Ges. Wiss.*, (5), VII, p.
 247, pl. 2, fig. 19.
 Habitat: Pennsylvania.

escheri (*Corixa*) Heer, 1853, *Ins. Tertiär. Oeningen*, III, p. 87; Uhler,
 1876, *Bul. U. S. Geol. Surv.*, II, p. 341.
 Habitat: Washington State.

expleta (*Corixa*) Uhler, 1895, *Bul. Colo. Agr. Exp. Sta.*, 31, p. 63.
 Habitat: Colorado.

forciceps (*Corixa*) Spinola, 1852, in Gay's *Chile, Zool.*, VII, p. 234.
 Habitat: Bolivia; Paraguay; Argentina; Chile.

fossarum (*Corixa*) Leach, 1818, *Trans. Linn. Soc.*, XII, p. 17.
 Habitat: California.

germari (*Corixa*) Fieber, 1848, *Bull. Soc. Mosc.* (pt. 2), p. 531; Kirkaldy, 1901, *Journ. Quekett Microsc. Club*, pl. 4, fig. 29.
 Habitat: Alaska.

harrisii (*Corixa*) Uhler, 1878, *Proc. Bost. Soc. N. H.*, XIX, p. 444.
 Habitat: Massachusetts.

hydatotropes (*Arctocorixa*) Kirkaldy, 1908, *Can. Ent.*, XL, p. 119.
 Habitat: North Carolina.

guatemalensis (*Corixa*) Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II,
 p. 377, pl. 22, figs. 19, 19a, b, ♂.
 Habitat: Guatemala.

inscripta (*Corixa*) Uhler, 1894, *Proc. Cal. Acad. Sci.*, (2), IV, p. 294.
 Habitat: Texas; Colorado; New Mexico; Arizona; Mexico.

interrupta (*Corixa*) Say, 1825, *Journ. Acad. Nat. Sci. Phila.*, IV, p.
 328; 1859, *Compl. Wtgs.*, II, p. 250.
 Habitat: New England States; New York; Maryland; Illinois;
 Minnesota; Missouri; Colorado; California; Mexico; Guatema-
 lama; Brazil.

irrorata (*Corixa*) Herrich-Schäffer, 1850, *Wanz. Ins.*, IX, p. 60.
 Habitat: Island of St. Barthélémy.

kennicottii (*Corixa*) Uhler, 1897, *Trans. Md. Acad. Sci.*, I, p. 393.
 Habitat: Illinois.

kirbyi (*Corixa*) Fieber, 1851, *Abh. böhm. Ges. Wiss.*, (5), VII, p. 255.
carinata (*Corixa*) W. Kirby, 1837, *Rich. Faun. Bor. Am.*, IV, p. 284.
 Habitat: Canada.*

laevigata (*Corixa*) Uhler, 1891, *Proc. Ent. Soc. Wash.*, II, p. 384.
 Habitat: Utah; Nevada; Washington; Oregon; California.

lateralis (*Corixa*) Leach, 1818, *Trans. Linn. Soc.*, XII, p. 17.
hieroglyphica (*Corixa*) Dufour, 1833, *Mem. Savans etr.*, IV, p. 214; Kirkaldy, 1901, *Journ. Quekett Micros. Club*, pl. 4, fig. 30.
 Habitat: Pennsylvania.

lineata (*Notonecta*) Förster, 1771, *Nov. Spec. Ins.*, p. 70.
 Habitat: North America.

macroceps (*Arctocorixa*) Kirkaldy, 1908, *Can. Ent.*, XL, p. 119.
 Habitat: North Carolina.

maculata (*Corixa*) Le Guillou, 1841, *Rev. Zool.*, p. 261.
 Habitat: Chile.

mariæ (*Corixa*) Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, p. 378, pl. 22, figs. 20, 20a, ♂.
 Habitat: Mexico.

melanogaster (*Corixa*) Kirkaldy, 1899, *Entomologist*, XXXII, p. 193.
 Habitat: Costa Rica.

mercenaria (*Corixia*) Say, 1832, *Descri. Het. Hem.*, p. 39 (Fitch reprint, p. 811); 1859, *Compl. Wtgs.*, I, p. 367; Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, pl. 22, figs. 23, 23a, b, ♂.
 Habitat: New Mexico; California; Mexico; Brazil; Bolivia.

naias Kirkaldy, n. nom.
sexlineata (*Corixa*) Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, p. 379, pl. 22, figs. 22, 22a, ♂.
 Habitat: Mexico.

nitida (*Corixa*) Fieber, 1851, *Abh. böhm. Ges. Wiss.*, (5), VII, p. 240, pl. 2, fig. 8.
 Habitat: North Carolina.

noveboracensis (*Notonecta*) Gmelin, 1789, *Syst. Nat.*, Ed. 13, p. 2119.
 Habitat: New York.

parvula (*Corixa*) Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, p. 378, pl. 22, figs. 21, 21a, ♂.
 Habitat: Mexico.

? **planifrons** (*Corixa*) W. Kirby, 1837, *Faun. Bor. Am.*, IV, p. 284.
 Habitat: Canada.

pygmæa (*Corixa*) Fieber, 1851, *Abh. böhm. Ges. Wiss.*, (5), VII, p. 236, pl. 2, fig. 1.
 Habitat: Cuba; Jamaica; St. Thomas; Colombia.

reticulata (*Corixa*) Guérin, 1857, *Sagra's Cuba*, pt. 2, VII, p. 177.
 Habitat: Cuba; Grenada.

* Doubtfully American.

serrulata (*Corixa*) Uhler, 1897, Trans. Md. Ac. Sci., I, p. 391.

Habitat: Arizona; California; Mexico.

signata (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 233, pl. I, fig. 16.

Habitat: Pennsylvania; Illinois.

stagnalis (*Corixa*) Leach, 1818, Trans. Linn. Soc., XII, p. 16; Kirkaldy, 1901, Journ. Quekett Microsc. Club, pl. 4, fig. 21.

limitata (*Corixa*) Fieber, 1848, Bull. Soc. Moscou (pt. 2), p. 528.

Habitat: Pennsylvania.

stigmatica (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 248, pl. 2, fig. 22.

Habitat: North America.*

utilis (*Corixa*) Uhler, 1876, Bul. U. S. Geol. Surv., II, p. 339.

Habitat: Colorado.

tarsalis (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 231, pl. I, fig. 13.

Habitat: Pennsylvania.

? *trilineata* (*Corixa*) Provancher, 1872, Nat. Can., IV, p. 108.

Habitat: Canada.

? *trivittata* (*Corixa*) Provancher, 1888, Pet. Faune Can., III, p. 203.

Habitat: Canada.

tumida (*Corixa*) Uhler, 1877, Bul. U. S. Geol. and Geog. Surv., III, p. 454.

Habitat: Colorado.

unguiculata (*Corixa*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p. 382, pl. 22, figs. 26, 26a, b, ♂.

Habitat: Mexico; Costa Rica.

verticalis (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 236, pl. I, fig. 22.

Habitat: Pennsylvania.

vulnerata (*Corixa*) Uhler, 1861, Proc. Acad. Nat. Sci. Phila., p. 284.

Habitat: Illinois; Montana; Washington; Oregon.

wallengreni (*Corixa*) Stål, 1859, Eugenie's Resa, Ins., p. 268.

Habitat: California.

zimmermannii (*Corixa*) Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 233, pl. I, fig. 18.

Habitat: Pennsylvania; "Carolina."

Genus 9. *HETEROCORIXA* F. B. White.

1879, Trans. Ent. Soc. Lond., p. 272.

hesperia F. B. White, 1879, Trans. Ent. Soc. Lond., p. 273.

Habitat: Brazil.

* Doubtfully American.

Family 12. NOTONECTIDÆ.

Subfamily I. NOTONECTINÆ.

Genus I. NOTONECTA Linnaeus.

1758, Syst. Nat., Ed. x, p. 439.

bifasciata (Notonecta) Guérin, 1844, Icon. Regne An., Ins., p. 354.
polystolisma Fieber, 1851, Abh. böhm. Ges. Wiss., (5), VII, p. 477.
 Habitat: Brazil; Uruguay; Argentina.

howardii (Notonecta) Bueno, 1905, Journ. N. Y. Ent. Soc., XIII, p. 151.
 Habitat: Arizona.

indica (Notonecta) Linnæus, 1771, Mantissa Plantarum, p. 534; Bueno,
 1905, Journ. N. Y. Ent. Soc., XIII, pl. 7, fig. 1.

americana (Notonecta) Fabricius, 1775, Syst. Ent., p. 690.

unifasciata (Notonecta) Guérin, 1857, Le Moniteur, p. (?).

dorsalis (Notonecta) Fieber, 1852, Abh. böhm. Ges. Wiss., (5),
 VII, p. 480.
 Habitat: Texas; Arizona; Washington State; California; Mexico;
 Cuba.

insulata (Notonecta) W. Kirby, 1837, in Richardson's Faun. Bor. Am.,
 Ins., p. 285; Bueno, 1905, Journ. N. Y. Ent. Soc., XIII, pl. 7, fig. 9.

impressa (Notonecta) Fieber, 1852, Abh. böhm. Ges. Wiss., (5),
 VII, p. 475.

rugosa (Notonecta) Fieber, 1852, Abh. böhm. Ges. Wiss., (5),
 VII, p. 476.

fabricii (Notonecta) Townsend, 1891, Proc. Ent. Soc. Wash.,
 II, p. 56.

? **rugosa, basalis, bicolor, cordigera, plagiata**, Fieber, 1852, Abh.
 böhm. Ges. Wiss., (5), VII, p. 475.
 Habitat: Across the continent north of the 40th parallel and as far
 south as Mexico on the Pacific slope; Brazil.

irrorata (Notonecta) Uhler, 1878, Proc. Bost. Soc. N. H., XIX, p. 443;
 Bueno, 1905, Journ. N. Y. Ent. Soc., XIII, pl. 7, fig. 6.
 Habitat: Ontario; Quebec; Connecticut; Massachusetts; New York;
 New Jersey; Maryland; Ohio; Illinois; Michigan; Kentucky.

? **lutea** (Notonecta) Bueno, 1905, Journ. N. Y. Ent. Soc., XIII, p. 160,
 pl. 7, fig. 7 (not Müller, 1776, Zool. Dan., p. 103).
 Habitat: British Columbia; Quebec.

mexicana (Notonecta) Amyot et Serville, 1843, Hist. Nat. Ins., Hém.,
 p. 453, pl. 8, fig. 7.

klugii (Notonecta) Fieber, 1852, Abh. böhm. Ges. Wiss., (5),
 VII, p. 474.
 Habitat: Arizona; California; Mexico; Costa Rica; Colombia.

montezuma (Notonecta) Kirkaldy, 1897, Trans. Ent. Soc. Lond., p.
 402; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 22, figs.
 8, 8a ♂, 9 ♀.
 Habitat: California; Mexico.

nigra (*Notonecta*) Fieber, 1852, *Abh. böhm. Ges. Wiss.*, (5), VII, p. 473.
 Habitat: Brazil.

raleighi (*Notonecta*) Bueno, 1907, *Can. Ent.*, XXXIX, p. 207.
 Habitat: New Jersey; Maryland; District of Columbia; North Carolina; Illinois.

shooterii (*Notonecta*) Uhler, 1894, *Proc. Cal. Acad. Sci.*, (2), IV, p. 292; Bueno, 1905, *Journ. N. Y. Ent. Soc.*, XIII, pl. 7, fig. 8.
 Habitat: California.

uhleri (*Notonecta*) Kirkaldy, 1897, *Ann. Mag. N. H.*, (6), XX, p. 58; Bueno, 1905, *Journ. N. Y. Ent. Soc.*, XIII, pl. 7, fig. 4.
 Habitat: Massachusetts; New York; New Jersey; Washington, D. C.; Florida; Louisiana; Missouri.

undulata (*Notonecta*) Say, 1832, *Descri. Het. Hem.*, p. 38 (Fitch reprint, p. 812); 1859, *Compl. Wtgs.*, I, p. 368; Bueno, 1905, *Journ. N. Y. Ent. Soc.*, XIII, pl. 7, fig. 2; Champion, 1901, *Biol. C.-Am., Hem.-Het.*, II, pl. 22, fig. 10, ♂.
americana (*Notonecta*) Gmelin, 1789, in Linnæus, *Syst. Nat.*, Ed. XIII, p. 2118.
scutellaris, *punctata*, *variabilis* (in part), *pallipes*, *maculata*, *unicolor*, Fieber, 1852, *Abh. böhm. Ges. Wiss.*, (5), VII, p. 476 et seq.

virescens (*Notonecta*) Blanchard, 1852, in Gay's *Chile, Zool.*, VII, p. 233.
pallipes (*Notonecta*) Lethierry, 1881, *Ann. Soc. Ent. Belg.*, XXV, p. 13 (not Fabricius).
 Habitat: All over Canada and the United States; Mexico; Cuba; Jamaica; Colombia; Peru; Chile.

variabilis (*Notonecta*) Fieber, 1852, *Abh. böhm. Ges. Wiss.*, (5), VII, p. 477 (in part); Bueno, 1905, *Journ. N. Y. Ent. Soc.*, XIII, pl. 7, fig. 3.
undulata (*Notonecta*) Uhler, 1885, *Stand. Nat. Hist.*, II, p. 252 (in part).

americana (*Notonecta*) Ashmead in Smith's *Ins. N. J.*, p. 144 (not Fabricius).
 Habitat: Maine; Connecticut; New York; New Jersey; Pennsylvania; District of Columbia; Ohio; Illinois; Michigan; Wisconsin; Nebraska; Brazil; Uruguay; Argentina.

Genus 2. ENITHARES Spinola.

1837, Essai Hém., p. 37.

Notonecta Linnaeus, Fabricius (in part).

Bothronotus Fieber, 1852, Abh. böhm. Ges. Wiss., (5), VII, pp. 206-470.
Enithara Signoret, 1860, Ann. Soc. Ent. France, (3), VIII, p. 971.

brasiliensis (Enithares) Spinola, 1837, Essai Hém., p. 60.

grandis (Notonecta) Herrich-Schäffer, 1850, Wanz. Ins., IX, p. 42, pl. 294, fig. 901.

Habitat: Brazil.

Genus 4. BUENOA Kirkaldy.

1904, Wien. Ent. Zeit., XXIII, p. 120.

Anisops of authors, in part (American species).

albida (Anisops) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p. 373,
 pl. 22, fig. 14♂.

platycnemis (Anisops) of some authors.

Habitat: Texas; Mexico.*

amnigenus (Anisops) F. B. White, 1879, Trans. Ent. Soc. Lond., p. 271.
 Habitat: Brazil.

antigone (Anisops) Kirkaldy, 1899, Entomologist, XXXII, p. 30.
 Habitat: Panama; Cuba; Jamaica; Santo Domingo; Ecuador;
 Bolivia; Argentina.

carinata (Anisops) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p.
 372, pl. 22, figs. 12, 12a, b, ♂.

?? *platycnemis* of some authors (Uhler, according to Champion).

Habitat: Southern United States; Mexico; British Honduras;
 Guatemala; Brazil; Argentina.

crassipes (Anisops) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p.
 374, pl. 22, fig. 15, ♂.

Habitat: Guatemala; Costa Rica.

elegans (Anisops) Fieber, 1852, Abh. böhm. Ges. Wiss., (5), VII, p. 484.
 Habitat: New York.

femoralis (Anisops) Fieber, 1852, Abh. böhm. Ges. Wiss., (5), VII,
 p. 483.

Habitat: West Indies; Porto Rico.

fuscipennis (Anisops) Berg, 1879, Hem. Arg., p. 198.

Habitat: Argentina.

ida (Buenoa) Kirkaldy, 1904, Wien. Ent. Zeit., XXIII, p. 121.

Habitat: Guatemala; Uruguay.

naias (Anisops) Kirkaldy, 1899, Entomologist, XXXII, p. 194.

Habitat: Venezuela; Chile; Argentina.

* Other localities not included, as being extremely doubtful. This genus badly needs a thorough revision.

pallens (*Anisops*) Champion, 1901, Biol. C.-Am., Hem.-Het., II, p. 374, pl. 22, fig. 16, ♂.

Habitat: Guatemala.

pallipes (*Notonecta*) Fabricius, 1803, Syst. Rhyng., p. 103.

Habitat: Mexico; Panama; Martinique; Jamaica; Guadeloupe; Venezuela; Ecuador; Bolivia.

platycnemis (*Anisops*) Fieber, 1852, Abh. böhm. Ges. Wiss., (5), VII, p. 485.

pallipes (*Anisops*) Kirkaldy, 1899, Entomologist, XXXII, p. 30 (not Fabricius).

Habitat: New York; New Jersey; Illinois.

salutis (*Buenoa*) Kirkaldy, 1904, Wien. Ent. Zeit., XXIII, p. 124.

Habitat: British Guiana.

NOTE.—The United States species of *Buenoa* are much confused. There has been in collections, masquerading as *platycnemis* Fieber, an uncertain number of species, of which three at least are known to us. The true species and *elegans* Fieber are very close together. The genus requires a thorough overhauling.

Genus 6. MARTAREGA F. B. White.

1879, Trans. Ent. Soc. Lond., p. 271.

Signoretiella Berg, 1883, An. Soc. Cient. Arg., XVI, p. 122.

membranacea (Martarega) F. B. White, 1879, Trans. Ent. Soc. Lond., p. 272.

uruguayensis (Signoretiella) Berg, 1883, An. Soc. Cient. Arg., XVI, p. 122.

Habitat: Central America; Brazil; Ecuador; Uruguay.

Subfamily 2. PLEINÆ.

Genus 1. PLEA Leach.

1817, Trans. Linn. Soc. Lond., XII, p. 11.

Ploa Stephens, 1829, Cat. Brit. Ins., II, p. 354.

Plæa Douglas and Scott, 1876, Cat. Brit. Hem., p. 61.

borellii (Plea) Kirkaldy, 1899, Bull. Mus. Zool. Anat. Comp. Torino, XIV, No. 352, p. 1.

Habitat: Argentina.

maculosa (Plea) Berg, 1879, Hem. Arg., p. 199.

Habitat: Argentina.

striola (Plea) Fieber, 1845 (?), Abh. böhm. Ges. Wiss., (5), III, p. 206, pl. 2, figs. 1-3.

Habitat: New York; New Jersey; Illinois; Iowa; California; Mexico; Guatemala; Cuba; St. Vincent; Grenada.

Division B. TROCHALOPODA.

Family 1. NEPIDÆ.

Genus 1. NEPA Linnaeus.

1758, Syst. Nat., Ed. x, p. 440.

apiculata (Nepa) Uhler, 1878, Proc. Bost. Soc. Nat. Hist., xix, p. 440; Harris, 1862, Ins. Inj. to Veg., pl. I, fig. I.

cinerea (Nepa) Ferrari, 1888, K. K. Hofmus. Wien, III, p. 191 (in part) (not Linnaeus).

Habitat: Ontario; Quebec; Massachusetts; Rhode Island; New York; New Jersey; Pennsylvania; Maryland; District of Columbia; Ohio; Illinois.

Genus 3. TELMATOTREPES Stål.

1854, Öfv. Vet.-Ak. Förh., xi, p. 241.

sculpticollis (Telmatotüpches) Stål, 1854, Öfv. Vet.-Ak. Förh., xi, p. 241; 1856, Öfv. Vet.-Ak. Förh., XIII, pl. 1a, fig. 6.

Habitat: Colombia.

Genus 6. CURICTA Stål.

1861, Öfv. Vet.-Ak. Förh., xviii, p. 263.

Helotenthes Berg, 1879, Hem. Arg., p. 194.

Nepoidea Montandon, 1895, Ann. Soc. Ent. Belg., xxxix, p. 476.

bonaërensis (Helotenthes) Berg, 1879, Hem. Arg., p. 195.

fallowi (Nepoidea) J. Martin, 1898, Bull. Soc. Ent. France, p. 66.

Habitat: Brazil; Argentina.

borellii (Curicta) Montandon, 1903, Bull. Soc. Sci. Buc., XII, p. 99.

Habitat: Argentina.

intermedia (Nepoidea) J. Martin, 1898, Bull. Soc. Ent. France, p. 66.

Habitat: Colombia.

scorpio (Curicta) Stål, 1861, Öfv. Vet.-Ak. Förh., xviii, p. 203; Champion, 1901, Biol. C.-Am., Hem.-Het., II, pl. 21, figs. 1, 1a.

montandoni (Nepoidea) J. Martin, 1898, Bull. Soc. Ent. France, p. 68.

Habitat: Mexico; Guatemala.

spectata (Curicta) Montandon, 1903, Bull. Soc. Sci. Buc., XII, p. 99.

Habitat: Brazil.

tibialis (Nepoidea) J. Martin, 1898, Bull. Soc. Ent. France, p. 66.

Habitat: Brazil.

volxemi (Nepoidea) Montandon, 1895, Ann. Soc. Ent. Belg., xxxix,

p. 476, fig. 6.

Habitat: Mexico.

Genus 7. **RANATRA** Fabricius.

1790, Skrft. Nat. Selsk., I, p. 227.

annulipes (*Ranatra*) Stål, 1854, Öfv. Vet.-Ak. Förh., xi, p. 241.

Habitat: Panama; Jamaica; Guadeloupe; Dutch Guiana; Brazil; Paraguay; Uruguay; Argentina.

brevicauda (*Ranatra*) Montandon, 1905, Bull. Soc. Sci. Buc., XIV, p. 391.

Habitat: Brazil.

camposi (*Ranatra*) Montandon, 1907, Ann. Soc. Ent. France, LXXVI, p. 59.

Habitat: Ecuador.

fabricii (*Ranatra*) Guérin, 1857, Sagra's Hist. Cuba, pt. 2, vii, p. 176.

Habitat: Texas; Guatemala; Cuba; Jamaica.

fusca (*Ranatra*) Palisot de Beauvois, 1805, Ins. rec. Afr. et Am., p. 235.**nigra** (*Ranatra*) Herrich-Schäffer, 1849, Wanz. Ins., ix, p. 32.

Hem. pl. 20, fig. 1.

Habitat: North Carolina; Louisiana.*

kirkaldyi (*Ranatra*) Bueno, 1905, Can. Ent., XXXVII, p. 188.

Habitat: Ontario; New York; North Carolina; Florida; Illinois; Michigan.

macrophthalma (*Ranatra*) Herrich-Schäffer, 1849, Wanz. Ins., ix, p. 31.

Habitat: Colombia; Dutch Guiana; Peru; Bolivia.

mixta (*Ranatra*) Montandon, 1907, Ann. Soc. Ent. Belg., LI, p. 78.

Habitat: French Guiana.

obscura (*Ranatra*) Montandon, 1907, Ann. Soc. Ent. France, LXXVI, p. 60.

Habitat: French Guiana.

quadridentata (*Ranatra*) Stål, 1861, Öfv. Vet.-Ak. Förh., XVIII, p. 204; Lugger, Bul. 69, Agr. Exp. Sta. Minn., fig. 12, as *R. fusca* P. B.

Habitat: Ontario; Quebec; Maine; Massachusetts; Rhode Island; Connecticut; Ohio; Illinois; New York; New Jersey; Maryland; Georgia; Michigan; Wisconsin; Minnesota; Iowa; Nebraska; Texas; Colorado; Arizona; California (?); Mexico.

rabida (*Ranatra*) F. B. White, 1879, Trans. Ent. Soc. Lond., p. 270.

Habitat: Brazil.

robusta (*Ranatra*) Montandon, 1905, Bul. Soc. Sci. Buc., XIV, p. 396.

Habitat: Brazil.

* Others records given by various authors are: Massachusetts; New York; New Jersey; Ohio; Illinois; Iowa; Texas; Mexico; Guatemala; Costa Rica; Panama. Owing to the great confusion in this species none of these is certain. They apply to one, if not two, other species, some undoubtedly referring to *Ranatra quadridentata* and others (among them one by the junior author) to an undescribed species.

signoreti (Ranatra) Montandon, 1905, Bul. Soc. Sci. Buc., xiv, p. 392.
Habitat: Brazil.

subinermis (Ranatra) Montandon, 1907, Ann. Soc. Ent. France, LXXVI, p. 66.

Habitat: French Guiana.

tuberculifrons (Ranatra) Montandon, 1907, Ann. Soc. Ent. France, LXXVI, p. 65.

Habitat: French Guiana.

unidentata (Ranatra) Stål, 1861, Öfv. Vet.-Ak. Förh., xviii, p. 203.
Habitat: Brazil; Uruguay; Argentina.

Genus 8. AMPHISCHIZOPS Montandon.

1898, Bul. Soc. Sci. Buc., vii, p. 5.

compressicollis (Ranatra) Montandon, 1898, Bul. Soc. Sci. Buc., vii, p. 3, text figure.

Habitat: Venezuela.

Family 2. GERRIDÆ.

Subfamily 1. VELIINÆ.

Genus 1. VELIA Latreille.

1804, Nouv. Dict. Hist. Nat., xxiv, Tabl. Méth., pp. 163-168.

Paravelia Breddin, 1898, J. B. Nat. Ver. Magdeburg, p. 12.

annulipes (Velia) Champion, 1898, Biol. C.-Am., Hem.-Het., ii, pp. 141, 142, pl. 9, fig. 8.

Habitat: Arizona; Mexico; Guatemala.

albotrimaculata (Velia) Kirkaldy, 1899, Ann. Soc. Ent. Belg., xlIII, p. 505.

Habitat: Venezuela.

basalis (Velia) Spinola, 1837, Essai Hém., p. 66.

bicolor (Velia) Blanchard, in d'Orbigny's Voy. Am. Mer., Ins., p. 218, pl. 29, fig. 1.

brasiliensis (Velia) Herrich-Schäffer, 1850, Wanz. Ins., ix, p. 76, fig. 935.

Habitat: Brazil.

boliviiana (Paravelia) Breddin, 1898, J. B. Nat. Ver. Magdeburg (1896-1897), p. 12.

Habitat: Bolivia.

brachialis (Velia) Stål, 1860, Svensk. Vet.-Ak. Handl., 2, No. 7, p. 82.

stagnalis (Velia) Uhler, 1894, Proc. Zool. Soc. Lond., p. 215 (not Burmeister); Champion, Biol. C.-Am., Hem.-Het., ii, pl. 9, figs. 6, 7.

Habitat: Mexico; Guatemala; Panama; Grenada; Brazil.

brunnea (*Velia*) Osborn, 1904, Ohio Nat., v, p. 204.

Habitat: Bolivia.

cinctipes (*Velia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 141, 143, pl. 9, fig. 9.

Habitat: Panama.

inveruglas (*Paravelia*) Kirkaldy, 1899, Boll. Mus. Zool. Anat. Comp. Torino, XIV, No. 350, p. 358 (?) (p. 4 of separate).

Habitat: Ecuador.

platensis (*Velia*) Berg, 1884, Hem. Arg., suppl., p. 117.

Habitat: Uruguay; Argentina.

stagnalis (*Velia*) Burmeister, 1835, Handb. Ent., II, p. 212.

Habitat: District of Columbia; North Carolina; Cuba.

virgata (*Velia*) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 486.

Habitat: Brazil.

vivida (*Velia*) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 486.

Habitat: Nicaragua.

Genus 3. **RHAGOVELIA** Mayr.

1865, Verh. zool.-bot. Ges. Wien, XV, p. 445.

Bacula Stål, 1865, Hem. Afr., III, p. 167.

Neovelia F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 487.

Trochopus Carpenter, 1898, Ent. Mo. Mag., XXXIV, p. 78.

(Table of Species, Kirkaldy, 1900, Ent., XXXIV, p. 308 et seq.)

angustipes (*Rhagovelia*) Uhler, 1894, Proc. Zool. Soc. Lond., p. 215.

obesa (*Rhagovelia*) Uhler, 1893, Proc. Zool. Soc. Lond., p. 706.

Habitat: Mexico; Panama; St. Vincent; Grenada; Venezuela.

armata (*Velia*) Burmeister, 1835, Handb. Ent., II, p. 212; Champion, Biol. C.-Am., Hem.-Het., II, pl. 8, fig. 24 ♀.

Habitat: Texas; Mexico.

collaris (*Velia*) Burmeister, 1835, Handb. Ent., II, p. 212.

fiebris (*Velia*) Guérin, 1857, in Sagra's Hist. Cuba, pt. 2, VII, p. 174.

Habitat: Cuba; Santo Domingo; Jamaica.

crassipes (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 131, 133, pl. 8, figs. 20, 21.

Habitat: Panama.

distincta (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 135, pl. 8, figs. 25, 26.

mexicana (*Rhagovelia*) Signoret, 1877, Bull. Soc. Ent. France, p. LV (manuscript).

Habitat: Mexico.

elegans (*Rhagovelia*) Uhler, 1894, Proc. Zool. Soc. Lond., p. 216.
Habitat: Grenada.

femoralis (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 134, pl. 8, fig. 23.
Habitat: Panama.

festae (*Rhagovelia*) Kirkaldy, 1899, Boll. Mus. Zool. Anat. Comp. Torino, XIV, No. 350, p. 4.
Habitat: Ecuador.

insularis (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 139, pl. 9, fig. 3.
Habitat: Panama.

obesa (*Rhagovelia*) Uhler, 1871, Proc. Bost. Soc. Nat. Hist., XIV, p. 107.
Habitat: Ontario; Massachusetts; New York; New Jersey; Maryland; District of Columbia; Virginia; North Carolina; South Carolina; Michigan; Tennessee.

plumbea (*Rhagovelia*) Uhler, 1894, Proc. Zool. Soc. Lond., p. 217.
marinus (*Trochopus*) Carpenter, 1898, Ent. Mo. Mag., XXXIV, p. 78, pl. 3.
Habitat: Florida; Nassau, Bahamas; Jamaica; Grenada; St. Vincent.

salina (*Trochopus*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 140, pl. 9, figs. 4 ♂, 5 ♀.
Habitat: Panama.

spinigera (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 137, pl. 8, figs. 28 ♀, 28a.
Habitat: Guatemala.

tayloriella (*Rhagovelia*) Kirkaldy, 1900, Entomologist, XXXIII, p. 72.
Habitat: Jamaica.

tenuipes (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 137, pl. 8, figs. 29 ♂, 30 ♀.
Habitat: Mexico.

trailii (*Neovelia*) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 487.
Habitat: Brazil.

uncinata (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 138, pl. 9, figs. 1, 2, 2a.
Habitat: Panama.

varipes (*Rhagovelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 132, 133, pl. 8, fig. 22.
Habitat: Mexico.

whitei (*Neovelia*) Breddin, 1898, Jahrb. Magdeburg Soc., p. 14.
Habitat: South America.

Genus 5. MACROVELIA Uhler.

1872, Hayden's U. S. Geol. Surv. Mont., etc., p. 422.

hornii (Macrovelia) Uhler, 1872, Hayden's U. S. Geol. Surv. Mont., etc., p. 422.

Habitat: Colorado; New Mexico; Arizona; California.

Genus 8. MICROVELIA Westwood.

1834, Ann. Soc. Ent. France, III, p. 647.

Hydroessa Burmeister, 1835, Handb. Ent., II, p. 213.

Veliomorpha Carlini, 1895, Ann. Mus. Genov., XXXV, p. 120.

albonotata (Microvelia) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 127, 129, pl. 8, fig. 7.

Habitat: Guatemala.

americana (Hebrus) Uhler, 1883, Stand. Nat. Hist., II, p. 274.

Habitat: Ontario; New York; New Jersey; Pennsylvania; North Carolina; Kansas; Colorado.

capitata (Microvelia) Guérin, 1857, in Sagra's Hist. Cuba, pt. 2, VII, p. 174.

Habitat: Cuba; Grenada.

circumcincta (Microvelia) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 127, 129, pl. 8, fig. 16.

Habitat: Guatemala.

flavipes (Microvelia) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 126, 127, pl. 8, fig. 12.

Habitat: Mexico.

incerta (Rhagovelia) W. F. Kirby, 1890, Journ. Linn. Soc. Lond., Zool., XX, p. 548.

Habitat: South America; Fernando Noronha.

longipes (Microvelia) Uhler, 1894, Proc. Zool. Soc. Lond., p. 219.

Habitat: Grenada.

marginata (Microvelia) Uhler, 1893, Proc. Zool. Soc. Lond., p. 719.

Habitat: New Jersey to Florida; California; Mexico; Cuba; St. Vincent; Grenada; Trinidad.

mirmula (Microvelia) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 487.

Habitat: Brazil.

modesta (Microvelia) Uhler, 1894, Proc. Zool. Soc. Lond., p. 220.

Habitat: Grenada.

paludicola (Microvelia) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 126, 127, pl. 8, fig. 13.

Habitat: Guatemala.

panamensis (Microvelia) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 126, 128, pl. 8, fig. 14.

Habitat: Panama.

pulchella (*Microvelia*) Westwood, 1834, Ann. Soc. Ent. France, III, p. 647, pl. 6, fig. 5.
 Habitat: West Indies.

robusta (*Microvelia*) Uhler, 1894, Proc. Zool. Soc. Lond., p. 219.
 Habitat: Grenada.

rufescens (*Microvelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 127, 130, pl. 8, fig. 18.
 Habitat: Guatemala.

setipes (*Microvelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 127, 130, pl. 8, fig. 19.
 Habitat: Mexico.

signata (*Microvelia*) Uhler, 1894, Proc. Cal. Acad. Sci., (2), IV, p. 289.
 Habitat: Mexico; Baja California.

stellata (*Microvelia*) Kirkaldy, 1902, Entomologist, XXXV, p. 281.
 Habitat: Ecuador.

torquata (*Microvelia*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 127, 128, pl. 8, fig. 14.
 Habitat: Guatemala.

vagans (*Microvelia*) F. B. White, 1878, Ann. Mag. Nat. Hist., (5), I, p. 374.
 Habitat: Hawaii (undoubtedly introduced from America).

Subfamily 2. GERRINAE.

Genus 1. GERRIS Fabricius.

1794, Ent. Syst., IV, p. 188.

Hydrometra Fabricius, 1803, Syst. Rhyng., p. 256 (not Latreille).

Limnotrechus Stål, 1868, Öfv. Vet.-Ak. Förh., XXV, p. 395.

canaliculatus (*Gerris*) Say, 1832, Descr. Het. Hem., p. — (Fitch reprint, p. 807); 1859, Compl. Wtgs., I, p. 363.
 Habitat: New York; New Jersey; North Carolina; Georgia.

cariniventris (*Gerris*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 148, pl. 9, figs. 11, 12.

Habitat: Mexico; Guatemala; Costa Rica; Panama.

chilensis (*Limnotrechus*) Berg, 1881, An. Soc. Cient. Arg., XII, p. 263.
 Habitat: Venezuela; Peru; Chile.

conformis (*Hygrotrechus*) Uhler, 1878, Proc. Bost. Soc. Nat. Hist., XIX, p. 435.

Habitat: Massachusetts; New York; New Jersey; Maryland;
 North Carolina.

fuscinervis (*Brachymetra*) Berg, 1898, Com. Mus. Buenos Aires, I, p. 3.
perseus (*Gerris*) Kirkaldy, 1899, Boll. Mus. Zool. Anat. Comp.

Torino, XIV, No. 351, p. 1.

andromeda (*Gerris*) Kirkaldy, 1899, Boll. Mus. Zool. Anat. Comp.
 Torino, XIV, No. 351, p. 2, figs. 8, 9.

Habitat: Ecuador; Bolivia; Argentina.

flavolineatus (Gerris) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 145, 149, pl. 9, figs. 13, 13a, 14, 15.
 Habitat: Mexico; Guatemala; Ecuador.

gillettei (Gerris) Lethierry et Séverin, 1896, Cat. Gén. Hém., III, p. 60.
productus (Limnotrechus) Uhler, 1895, Bul. Colo. Agr. Exp. Sta., 31, p. 61 (preoc.).
 Habitat: Colorado.

mexicanus (Gerris) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 145, 147, pl. 9, fig. 10.
 Habitat: Mexico.

marginatus (Gerris) Say, 1832, Descr. Het. Hem., p. — (Fitch reprint, p. 807); 1859, Compl. Wtgs., I, p. 362.
 Habitat: Ontario; Quebec; Maine; Connecticut; New York; New Jersey; Pennsylvania; District of Columbia; Virginia; North Carolina; Illinois; Michigan; Missouri; Kansas; Colorado; Oregon.

remigis (Gerris) Say, 1832, Descr. Het. Hem., p. — (Fitch reprint, p. 806); 1859, Compl. Wtgs., I, p. 362.
 Habitat: Ontario; Maine; New York; New Jersey; Pennsylvania; Maryland; Illinois; Michigan; Texas; Colorado; Arizona; Oregon; California; Mexico; Guatémala.

orba (Gerris) Stål, 1859, Eugenie's Resa, Ins., p. 264.
 Habitat: Oregon; California.

robustus (Hygrotrechus) Uhler, 1871, Silliman's Amer. Journ. Sci., p. 105.
 Habitat: Arizona; California; Baja California; Mexico.

Genus 2. TENAGOGONUS Stål

1853, Öfv. Vet.-Ak. Förh., x, p. 263.

Limnometra Mayr, 1865, Verh. zool.-bot. Ges. Wien, xv, p. 444.

opacus (Limnometra) Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 150, pl. 9, figs. 16, 16a.
 Habitat: Costa Rica; Panama.

quadrilineatus (Limnometra) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 150, 151, pl. 9, fig. 17.
 Habitat: Mexico; Costa Rica; Nicaragua; Brazil.

Genus 3. LIMNOPORUS Stål

1868, Öfv. Vet.-Ak. Förh., xxv, p. 395.

rufoscutellatus (Gerris) Latreille, 1807, Gen. Ins., III, p. 134; Herrich-Schäffer, 1850, Wanz. Ins., IX, fig. 924.
 Habitat: British Columbia; Ontario; Quebec; New York; New Jersey; Pennsylvania; Illinois; Michigan; Wisconsin; Colorado; Oregon.

Genus 4. **LIMNOGONUS** Stål

1868, Hem. Fabr., I, p. 132.

Lamprotrechus Reuter, 1882, Öfv. Finska Vet. Soc. Förh., xxv, p. 40.*franciscanus* (Gerris) Stål, 1859, Eugenie's Resa, Ins., p. 265.

Habitat: California.

guérini (Gerris) Lethierry et Séverin, 1894, Cat. Gén. Hém., III, p. 61.*marginatus* (Gerris) Guérin, 1844, Icon. Regne An., Ins., p. 351, pl. 57, fig. 2.

Habitat: Mexico; British Honduras; Cuba; Jamaica; St. Vincent; Grenada.

hesione (Gerris) Kirkaldy, 1902, Entomologist, xxxv, p. 137.

Habitat: Florida.

hyalinus (Hydrometra) Fabricius, 1803, Syst. Rhyng., p. 258.

Habitat: Panama; Trinidad; French Guiana; Brazil; Ecuador.

lotus (Limnogonus) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 488.

Habitat: Brazil.

lubricus (Limnogonus) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 489.

Habitat: Brazil.

Genus 7. **CYLINDROSTETHUS** Fleber.

1860, Eur. Hem., p. 33.

Hydrobates Erichson, 1848, in Schomburgk's Faun. Brit. Guiana, III, p. 614 (preoc.).*erythropus* (Hydrometra) Herrich-Schäffer, 1850, Wanz. Ins., IX, p. 68, fig. 923.

Habitat: Brazil.

linearis (Hydrobates) Erichson, 1848, in Schomburgk's Faun. Brit. Guiana, III, p. 614.

Habitat: British Guiana.

regulus (Hydrobates) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 488.

Habitat: Brazil.

Genus 11. **METROBATES** Uhler.

1871, Proc. Bost. Soc. Nat. Hist., XIV, p. 108.

hesperius (Metrobates) Uhler, 1871, Proc. Bost. Soc. Nat. Hist., XIV, p. 108.

Habitat: New York; Maryland; North Carolina.

Genus 12. **PLATYGERRIS** F. B. White.

1883, Ent. Mo. Mag., xx, p. 36.

cæruleus (*Platygerris*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 157, pl. 9, fig. 25.

Habitat: Costa Rica.

depressus (*Platygerris*) F. B. White, 1883, Ent. Mo. Mag., xx, pp. 36, 39; Champion, Biol. C.-Am., Hem.-Het., II, pl. 9, figs. 23, 24, 24a.

Habitat: Mexico.

Genus 13. **POTAMOBATES** Champion.

1898, Biol. C.-Am., Hem.-Het., II, p. 154.

bidentatus (*Potamobates*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 154, 155, pl. 9, figs. 22, 22a.

Habitat: Mexico; Ecuador.

unidentatus (*Potamobates*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 154, 155, pl. 9, figs. 20, 20a, b, c, 21.

Habitat: Panama.

Genus 14. **BRACHYMETRA** Mayr.

1865, Verh. zool.-bot. Ges. Wien, xv, p. 445.

albinervus (*Halobates*) Amyot et Serville, 1843, Hist. Nat. Ins. Hém., p. 412; Mayr, 1866, Reise der Novara, Hem., pl. 5, figs. 55a, b.

Habitat: Panama; St. Vincent; Grenada; Brazil.

kleopatra (*Brachymetra*) Kirkaldy, 1899, Boll. Mus. Zool. Anat. Comp. Torino, xiv, No. 350, p. 3.

Habitat: Ecuador.

Genus 15. **CHARMATOMETRA** Kirkaldy.

1899, Ann. Soc. Ent. Belg., XLVIII, p. 509.

bakeri (*Brachymetra*) Kirkaldy, 1898, Entomologist, XXXI, p. 101.

Habitat: Colombia; Ecuador.

Genus 17. **TELMATOBATES** Berg.

1898, Comun. Mus. Nac. Buenos Aires, I, p. 4.

• *bonairensis* (*Telmatobates*) Berg, 1898, Comun. Mus. Nac. Buenos Aires, I, p. 5.

Habitat: Argentina.

Genus 18. **TREPONATOPSIS** Champion.

1898, Biol. C.-Am., Hem.-Het., II, p. 157.

denticornis (*Trepobatopsis*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 158, pl. 9, figs. 26, 26a.

Habitat: Mexico.

Genus 19. **KALLISTOMETRA** Kirkaldy.

1899, Entomologist, XXXII, p. 28.

taylori (Kallistometra) Kirkaldy, 1899, Entomologist, XXXII, p. 28.
Habitat: Jamaica.

Genus 21. **HALOBATOPSIS** Bianchi.

' 1896, Ezheg. Zool. Mus. St. Peterbg., I, p. 70.

platensis (Trepobates) Berg, 1879, Hem. Arg., p. 183.
Habitat: Argentina.

Genus 23. **TREPONATES** Uhler.

1894, Proc. Zool. Soc. Lond., p. 213.

Stephania F. B. White, 1883, Voy. Chall., Zool., VII, p. 79.

pictus (Halobates) Herrich-Schäffer, 1848 (?), Wanz. Ins., VIII, p. III,
figs. 882, 883.

Habitat: Massachusetts; New York; New Jersey; Pennsylvania;
Maryland; Virginia; North Carolina; Illinois; Tennessee;
Louisiana; Cuba; Grenada.

Genus 23a. **TELMATOMETRA** Bergroth.

1908, Ohio Nat., VIII, p. 374.

whitei Bergroth, 1908, Ohio Nat., VIII, p. 376.Genus 24. **RHEUMATOBATES** Bergroth.

1892, Ins. Life, IV, p. 321.

Hymenobates Uhler, 1894, Proc. Zool. Soc. Lond., p. 214.

imitator (Hymenobates) Uhler, 1894, Proc. Zool. Soc. Lond., p. 214.
bergrothi (Rheumatobates) Meinert, 1895, Ent. Medd., V, p. 6,
pls. I, 2.

Habitat: Grenada.

præposterus Bergroth, 1908, Ohio Nat., VIII, p. 376, figs. 4, 5.
Habitat: Guatemala.

rileyi (Rheumatobates) Bergroth, 1892, Ins. Life, IV, p. 321.
Habitat: New York; New Jersey; District of Columbia.

tenuipes (Rheumatobates) Meinert, 1895, Ent. Medd., V, p. 7.
rileyi (Rheumatobates) Bergroth, 1892, Ins. Life, IV, p. 321 (in
part).

Habitat: District of Columbia.

Genus 29. HALOBATES Eschscholtz.

1823, Nat. Abh. Dorpat, I, p. 163.

micans (Halobates) Eschscholtz, 1823, Nat. Abh. Dorpat, I, p. 163.
wüllerstorffi (Halobates) Frauenfeld, 1867, Verh. zool.-bot. Ges. Wien, XVII, p. 458; F. B. White, 1883, Rep. Chall. Exp., Zool., pl. I, fig. 2.

Habitat: Off coast of Brazil; Florida coast.

sericeus (Halobates) Eschscholtz, 1823, Nat. Abh. Dorpat, I, p. 163,
pl. 2, fig. 4.

Habitat: Pacific Ocean, California to Chile.

Subfamily 3. MESOVELIINÆ.

Genus 1. MESOVELIA Mulsant and Rey.

1852, Ann. Soc. Linn. Lyon, p. 138.

Fieberia Yakovlev, 1874, Trudy Russk. Ent., VII, p. 32.

amoena (Mesovelia) Uhler, 1894, Proc. Zool. Soc. Lond., p. 218.

Habitat: Grenada.

mulsanti (Mesovelia) F. B. White, 1879, Trans. Ent. Soc. Lond., p. 268; Champion, 1898, Biol. C.-Am., Hem.-Het., II, pl. 8, figs. 10, 11.

bisignata (Mesovelia) Uhler, 1883, Stand. Nat. Hist., II, p. 274,
fig. 324.

Habitat: Massachusetts; New York; New Jersey; Maryland;
North Carolina; Florida; Illinois; Texas; Mexico; Guatemala;
Panama; Cuba; Guadeloupe; Santo Domingo; St. Vincent;
Grenada; Brazil.*

Subfamily 4. HYDROMETRINÆ.

Genus 1. HYDROMETRA Latreille.

1796, Précis Charact. Gen. Ins., p. 86.

Limnobates Burmeister, 1835, Handb. Ent., II, p. 210.

agenor (Hydrometra) Kirkaldy, 1902, Entomologist, XXXV, p. 281.

Habitat: Ecuador.

argentina (Hydrometra) Berg, 1879, Hem. Arg., p. 182.

Habitat: Argentina; Brazil.

australis (Hydrometra) Say, 1832, Descr. Het. Hem., p. 35 (Fitch reprint, p. 807); 1859, Compl. Wtgs., I, p. 361; Bueno, 1905, Can. Ent., XXXVII, fig. 3.

Habitat: Georgia; Florida; Louisiana.

caraiba (Hydrometra) Guérin, 1856, in Sagra's Hist. Cuba, pt. 2, VII,
p. 173.

Habitat: Panama; Cuba.

* Distant, 1906, erroneously records it from the Oriental Region.

lentipes (*Hydrometra*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 124, 125.

Habitat: Guatemala.

martini (*Hydrometra*) Kirkaldy, 1900, Entomologist, XXXIII, p. 175.

lineata (*Hydrometra*) Say, 1832, Descr. Het. Hem., p. 35 (Fitch reprint, p. 807); 1859, Compl. Wtgs., I, p. 361; Martin, 1900, Can. Ent., XXXII, pl. 3, figs. 1-10, text fig. 7.

Habitat: Ottawa, Ontario; New York; New Jersey; Pennsylvania; Maryland; District of Columbia; North Carolina; Florida; Indiana; Illinois; Louisiana; Texas; Mexico.

mensor (*Hydrometra*) F. B. White, 1879, Trans. Ent. Soc. Lond., p. 267.

Habitat: Brazil.

metator (*Hydrometra*) F. B. White, 1879, Journ. Linn. Soc. Lond., Zool., XIV, p. 486.

Habitat: Brazil.

naiades (*Hydrometra*) Kirkaldy, 1902, Entomologist, XXXV, p. 281.

mensor (*Hydrometra*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 124, 125 (not F. B. White).

Habitat: Panama.

Family 3. NÆOGEIDÆ.

Hebride of authors.

Genus 1. NÆOGEUS Laporte.

1832, Essai Hém., p. 32.

Hebrus Curtis, 1833, Ent. Mag., I, p. 198.

bilineatus (*Hebrus*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 118, 119, pl. 8, fig. 3.

Habitat: Mexico.

burmeisteri (*Hebrus*) Lethierry et Sévérin, 1896, Cat. Hém., III, p. 51.

pusillus (*Hebrus*) Burmeister, 1835, Handb. Ent., II, p. 214 (not Fallen).

Habitat: United States.

concinnus (*Hebrus*) Uhler, 1894, Proc. Zool. Soc. Lond., p. 221.

Habitat: Quebec; New York; New Jersey; Pennsylvania; Maryland; Illinois; Colorado; Washington State; California; Guatemala; Panama; Grenada.

consolidus (*Hebrus*) Uhler, 1894, Proc. Zool. Soc. Lond., p. 222; Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 119, pl. 8, fig. 4.

Habitat: Guatemala; Panama; Grenada.

hirsutus (*Hebrus*) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 118, 119, pl. 8, fig. 2.

Habitat: Mexico.

laeviventris (Hebrus) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 118, 120, pl. 8, fig. 5.

Habitat: Panama.

major (Hebrus) Champion, 1898, Biol. C.-Am., Hem.-Het., II, p. 118, pl. 8, fig. 1.

Habitat: Mexico.

parvulus (Hebrus) Stål, 1860, Svensk. Vet.-Ak. Handl., 2, No. 7, p. 60.

Habitat: N. Brazil.

sobrinus (Hebrus) Uhler, 1877, Bul. U. S. Geol. and Geog. Surv., III, p. 452.

Habitat: Colorado.

sulcatus (Hebrus) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 118, 120, pl. 8, fig. 6.

Habitat: Panama.

Genus 2. MERRAGATA F. B. White.

1877, Ann. Mag. Nat. Hist., (4), xx, p. 113.

Lipogomphus Berg, 1879, Hem. Arg., p. 286.

brevis (Merragata) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 121, 122, pl. 8, fig. 9.

Habitat: Mexico; Guatemala; Panama.

hebroides (Merragata) F. B. White, 1877, Ann. Mag. Nat. Hist., (4), xx, p. 114; Champion, Biol. C.-Am., Hem.-Het., II, pl. 8, fig. 7.

Habitat: Mexico. (Also introduced into Hawaii.)

lacunifera (Lipogomphus) Berg, 1879, Hem. Arg., p. 287.

Habitat: Argentina.

leucosticta (Merragata) Champion, 1898, Biol. C.-Am., Hem.-Het., II, pp. 121, 122, pl. 8, fig. 8.

Habitat: Guatemala.

INDEX TO VOLUME X.

Acallis grifhalis, 96.
Acanthocorydalis, 29.
Acrobasis, Notes on the species, with descriptions of new ones, 41; Descriptions of two new species, 160; Table of North American species, 41; *angurella*, 42; *betulella*, 47; *caryæ*, 46; *caryivorella*, 44; *comptoniella*, 46; *coryliella*, n. sp., 47; *demotella*, 42; *eliella*, n. sp., 43; *evanescellæ*, n. sp., 44; *hebescellæ*, 44; *irrubiella*, n. sp., 161; *kearfottella*, 44; *latifasciella*, n. sp., 45; *malipennella*, 47; *minimella*, 43; *nebulella*, 45; *nigrosgnella*, 43; *normella*, n. sp., 46; *palliolella*, 44; *rubrifasciella*, 46; sp., 48; *stigmella*, n. sp., 43; *sylviella*, n. sp., 161.
Acysta interrupta, 104; *perseæ*, n. sp., 103.
Adetus subellipticus, 61.
Adistemia watsoni, Note on, 3.
Agapema homogena, n. sp., 82.
Agapostemon melliventris, Observation on, 9.
Agdistis adactyla, 60.
Aglossa acallalis, n. sp., 97; *cuprealis*, 97; *cuprina*, 97.
Ainalie, C. N., *Tetrastichus* as a parasite on *Polygnotus*, 14; Note on the occurrence of *Campyloomyza scutellata* Say, 16; Tenacity of life in *Evania urbana* Bradley, 17.
Aleyrodes citri, 63.
Aleyrodidae, Two new species of parasites of, 63.
Ambesa mirabella, n. sp., 59.
Amestria oculiferalis, 94.
Anoplodes delicataria, n. sp., 57.
Animomyia, n. gen., 53; *morta*, n. sp., 53.
Anthonomus æneolus, 5; *brevirostris*, 6; *eugenii*, 5; *mexicanus*, 6.
Aphidids parasitized by *Lysiphlebus*, 163.
Apomecyna pertigera, 61.
Aponomma inornata, n. sp., 171.
Apple miner, 2.
Argyresthia conjugella, 120, 122.
Arta olivalis, 44; *statalis*, 44.
Arthropoda in Portuguese West Africa, 157.
Artopsis, n. gen., 95; *borregalis*, n. sp., 95.
Ashmead, W. H., Obituary of, 126; Bibliography of, 131; Index to new genera described by, 149.
Aspidotus diffinis, 72.
Atoposomoidea, n. gen., 161.
Atriplicia, n. gen., 169; *gallicola*, n. sp., 169.
Axylia vitrina, 32.
Balaninus, New species, with notes, 19; *baculi*, n. sp., 20; *baculi* var. *curtus*, n. var., 21; *caseyi*, n. n., 26; *orthorhynchus*, n. sp., 26; *pardalis*, n. sp., 24; *parvidens*, n. sp., 24; q.-*griseæ*, n. sp., 22; *uniformis*, 22; *victoriensis*, 23.
Bandera binotella, 116; *cupidinella*, 116; *virginella*, n. sp., 116.
Banks, Nathan, On the classification of the *Corydaline*, with description of a new species, 27; A new *Tetranychus*, 36; Three new ticks from the United States, 170.
Barber, H. S., Communications by, 5, 14, 61, 70, 119.
Bee, A deceptive, 66.
Bees, Three new, of the genus *Nomada*, 83.
Benguella, Portuguese West Africa, Insects of, 157.
Boros unicolor, 18.
Brachyloma decorosella, n. sp., 111; *querciella*, n. sp., 112.
Braconid, A new, of the genus *Elasmosoma*, 168.
Bradipodicola hahneli, 82.
Brassolis isthmia, A lepidopterous insect highly injurious to cocoanut culture in the Panama Canal Zone, 164.
Bruchophagus funebris, 109.
Bueno, J. R. de la Torre, and G. W. Kirkaldy, A Catalogue of American aquatic and semiaquatic Hemiptera, 173.
Burgess, A. F., Communication by, 5.
Burke, H. E., Communication by, 18.
Busck, August, Two new stenomid moths from the eastern United States, 111.

Calosoma devouring larvæ of *Heterocampa*, 9.
Campometra cinctipalpis, 33; *mascara*, 33.
Campylomyza scutellata, Note on occurrence of, 16.
Caphys bilinea, 94.
Capulinia sallei, 109.
Cayuga bistriatella, 117; *pamponerella*, n. sp., 117.
Chalinitis olealis, 93.
Chalybion coruleum, 62.
Chauliodes, 30.
Chion cinctus, 162.
Chittenden, F. H., New species of *Balaninus*, with notes, 19.
Chlorochlamys voluntaria, 34.
Chloronia, n. subgen., 30.
Chrysaugine, A review of the North American, 92; Table of genera, 92.
Cioide, New bicolored, 74.
Cis bimaculatus, n. sp., 76; *superbus*, n. sp., 75.
Clydonopteron tecome, 93.
Coccid, A new, of the genus *Eriococcus*, 167; A new gall-making, on *Atriplex*, 169.
Coccid on mistletoe in Texas, 10.
Cochliidi, Notes on some American, with descriptions of new species, 48.
Cockerell, T. D. A., A deceptive bee, 66; Three new bees of the genus *Nomada*, 83; A new coccid of the genus *Eriococcus*, 167; A new braconid of the genus *Elasmosoma*, 168.
Cockerell, T. D. A., and S. A. Rohwer, A new gall-making coccid on *Atriplex*, 168.
*Cocoanut trees injured by *Brassolis isthmia**, 164.
Coenipeta bibitrix, 33.
Coenocalpe carnata, 86.
Colletes americanus, 67; *nudus*, 67.
Condylolomia participialis, 96.
Coniferous trees, Effect of defoliation on, 11.
Corydalina, On the classification of, with description of a new species, 27; Table of genera, 28.
Corydalis, 29.
Cosmocomoidea, n. gen., 68; *morrilli*, n. sp., 69.
Couden, F. D., Communication by, 14.
Crawford, J. C., The entomological writings of William Harris Ashmead, with an index to the new genera described by him, 131.
Cryptoses cholœpi, 81.

Culicid destroyed by nighthawk, 61.
Cymatophora tenebrosata, 87.

Datana integerrima, 74.
Deilinia indurata, n. sp., 56.
Dermacentor modestus, n. sp., 170.
Destutia, n. gen., 91; *novata*, n. sp., 91.
Diabrotica longicornis, Change of habits, 73.
Diaspis pentagona, 71, 72.
Dicymolomia opuntialis, n. sp., 113.
Diplosis sorghicola, 109.
Dipterygia minorata, 32.
Dorcatoma dresdensis, 61.
Dyar, H. G., Notes on a few apparent cases of synonymy in Lepidoptera, 30; Notes on the species of *Acrobasis*, with descriptions of new ones, 41; Notes on some American Cochliidi, with descriptions of new species, 48; Descriptions of some new moths from Southern California, 52; A further note on the sloth moth, 81; A new Saturnian moth from the Southwest, 82; A review of the North American Chrysaugine, 92; A review of the North American Pyraline, 96; Descriptions of eleven new North American Pyralidæ, with notes on a few others, 112; The larva of *Lerina incarnata* Walk., 162.
Dynastes, Illustrations of species, 70.

Elm leaf-beetle, Introduction of a parasite, 119.
Elophila demonalis, n. sp., 112.
Ely, Charles R., Descriptions of two new species of *Acrobasis*, 160.
Encarsia variegata, n. sp., 64.
Ennearthron annulatum, n. sp., 80; *pallidum*, n. sp., 79; *transversatum*, n. sp., 79.
Entomological Society of Washington, Election of Officers for 1908, 1; Resolutions adopted regarding death of Dr. W. H. Ashmead, 124.
Entomology in Portuguese West Africa, 157.
Enypia griseata, n. sp., 87.
Ephestiodes mignonella, n. sp., 113.
Epeorus vernoniz, 67.
Epiperola monochroma, n. sp., 51; *vafera*, 50; *vaferella*, n. sp., 51.
Erastris immuna, 31; *nigellus*, 31.
Eremocerus haldemani, n. sp., 65.
Eriococcus quercus gilensis, n. subsp., 167.

Ernporus jalappæ, 124.
Eubaphe ostenta, 31.
Eubolina meskei, 33.
Euclea norba, 49.
Eucrostis hollandaria, 35; *jaspidearia*, 35; *saltusaria*, 35.
Euphenolia pallimedia, n. sp., 86.
Euthrips pyri, 120.
Euxoa fieldii, n. sp., 54.
Evania urbana, Tenacity of life, 17.
Euzophera placidella, n. sp., 115.

Fly-paper experiment, 119.
Frost, H. L., Communication by, 72.

Galasa rubidana, 93.
[*Galerucella luteola*], 119.
Gelasma masonaria, 34.
Geometra congrua, 35; *protractaria*, 35.
Geometridæ, Additions to the list of North American, with notes on some described species, 85.
Gipsy moth, Change of habit, 72; Encyrtid egg-parasites of in Japan, 161.
Glaphyria periculosalis, n. sp., 58.
Glaucina epiphysaria, n. sp., 55.
Gnathotrichus living in bark saturated with salt water, 19.
Gonodontis subcineraria, n. sp., 88.
Gortyna triorthia, 32.
Grossbeck, John A., Additions to the list of North American Geometridæ, with notes on some described species, 85.

Hadena patina, 32.

Heidemann, Otto, Two new species of North American Tingitidæ, 103; Shorter remarks, 14, 110.

Hemiptera, A Catalogue of American aquatic and semiaquatic, 173.

Hemicoccephalus culicis, 7.

Herclia binodulalis, 100; *himonialis*, 101; *infimbrialis*, n. sp., 100; *intermedialis*, 99; *olinalis*, 101; *planalis*, 99; *phezalis*, n. sp., 100; *thymetusalis*, 100.

Hermes, 29.

Hessian fly larvæ parasitized by *Polygnotus*, 15.

Heterocampa manteo, Injury by, to oak forests in Texas, 8.

Holomelina calera, 31.

Homohadema candida, 31; *terminellus*, 31.

Hooker, W. A., Injury to oak forests

in Texas by *Heterocampa manteo* Doubleday, 8; An observation on *Agapostemon melliventris* Cresson, 9.

Hopkins, A. D., Communications by, 1, 10, 18, 109, 110, 119, 123, 124.

Howard, L. O., On two new species of parasites of Aleyrodidæ, 63; A new genus and species of Mymaridæ, 68; Shorter Communications, 60, 71, 72, 119, 161.

Hydriomena latirupta, 34; *manzanita*, 85.

Hylastinus obscurus, 111.

Hymenoptera, List of genera proposed by Dr. W. H. Ashmead, 149.

Hypsopygia costalis, 99.

Ignotus enigmatus, 14.

Insects, Causes of geographical distribution, 109; Circumpolar species, 110; Change of habit, 72; Retarded development, 162; Tenacity of life, 17; Defoliating hardwood timber, 10; Immunity of trees growing in forests from attacks of, 74; Taken from crow's nest, 70; In peat bogs, 123; In Portuguese West Africa, 158; Berlese's automatic sifting apparatus, 71.

Iodus indeclararia, 35.

Ipidae living in bark saturated with sea water, 18.

Ips decretus, 18; *cælatus*, 19.

Irish notes and insects, 123.

Ixodes texanus, n. sp., 172.

Ixodidæ, Three new, from the United States, 170.

Jennings, Allan H., Mosquitoes destroyed by the nighthawk, 61.

Kelly, E. O. G., and T. D. Urbahns, Experiments with *Lysiphlebus*, 163, 164.

Kirkaldy, G. W., and J. R. de la Torre Bueno, A Catalogue of the American aquatic and semiaquatic Hemiptera, 173.

Knab, Frederick, Swarming of a reduviid, 7; The early stages of *Sayomyia punctipennis* Say, 36.

Kodiosoma fulva, 30; *otera*, 30.

Kraus, E. J., New bicolored Cioidæ, 74.

Lampyrid (?) larva from California, 14.

Leptobyrsa explanata, n. sp., 105.

Lepidoptera, Notes on a few apparent cases of synonymy, 30; Heterocera, Some new, from southern California, 52; Breeding in the hair of sloths, 52. Lepidopterous apple-miner, 2. *Lerina incarnata*, Larva of, 162. *Liparis monacha*, 11. Lloyd, F. E., Communication by, 123. *Lophoceramica*, n. gen., 32; *artega*, 32; *pyrrha*, 33. *Lophococcus mirabilis*, 163. *Lysiphlebus tritici*, 163; Parthenogenesis in, 12, 164. Marlatt, C. L., Communications by, 72, 123. *Marmara*, 2. *Mayetiola destructor*, 15, 16. *Megasoma*, a new species from Arizona, 70. *Megastigmus collaris*, 108; *pinus*, 109. *Meris alticola*, 88. *Metasia morenalis*, n. sp., 58. *Metraga emilia*, n. sp., 50; *perplexa*, 49; *rubicolor*, 50; *zygia*, 49. *Microrrhagus pectinatus*, 110. Mosquitoes destroyed by the nighthawk, 61. Moths, Descriptions of some new, from California, 52. *Mymaridae*, A new genus and species of, 68. *Natada arpi*, n. sp., 50; *salta*, 50. *Neohermes*, n. gen., 29; *humeralis*, n. sp., 27. *Neophysia menapia*, 11. *Neuromus*, 30. Nighthawk destroying mosquitoes, 61. *Nigronia*, n. gen., 30. *Nomada carolina*, 67; *cornelliana*, n. sp., 84; *mera*, n. sp., 83; *mimula*, n. sp., 66; *ovata*, 67; *perplexa*, 67; *placida*, 67; *undulaticornis*, 67; *xanthura*, n. sp., 84. *Odontoptila sicutolodaria*, 33. *Odontota dorsalis*, 10. *Ollia holoponerella*, n. sp., 117. *Omphalocera cariosa*, 101; *dentosa*, 101. *Orthocis huesanus*, n. sp., 77; *pulcher*, n. sp., 78. *Pachyophthalmus signatus*, 62. *Packardia ceanothi*, n. sp., 51. *Papaipepsis pterisi*, 32. *Parasa*, Partial table of species, 49; fauna, n. sp., 48; *imitata*, 48; *wellesca*, 49. Parasites, of Aleyrodidae, On two new species, 63; of Hessian-fly larva, 15; of aphids, 12, 163; of *Blattella germanica*, 162; of *Polygnotus*, 14; of ticks, 119. *Parachma ochracealis*, 46. *Parthenium argentatum*, Scolytid injurious to, 123, 124. Parthenogenesis in *Lysiphlebus*, 12. Patten, J. D., Communication by, 6. Pear thrips, 120. Peat bogs, Insects peculiar to, 123. *Pectinigera bistriatella*, 117; *pamponerella*, n. sp., 117. Pepper weevil, 5. *Percnoptilo fluviorum*, 34. *Perigea lucetta*, 32; *roxana*, 32. *Petrophora iduata*, 33. *Phengodes laticollis*, 120. Phillips, W. J., Notes on Toxoptera graminum and parthenogenesis of one of its parasites, 11. *Phloeotribus liminaris*, 122. *Phobolosia*, n. gen., 52; *reincarnata*, n. sp., 52. *Phoradendron flavescens*, Coccidae on, 10. *Phorodesma niveociliaria*, 35. *Pigia albiserpentata*, 33. Piper, C. V., Communication by, 109. *Pityophthorus nigricans*, 124. *Plemyria mortuaria*, 34; *paranensis*, 34. *Pogonocherus californicus*, 119. *Polygnotus* parasitized by *Tetrastichus*, 14. *Porthetria dispar*, 72, 161. Portuguese West Africa, Insects in, 157. *Prospalta berlesei*, 71. *Protohermes*, 29. Pyralinae, A review of the North American, 96; Table of genera, 97. *Pyralis costiferalis*, 98; *disciferalis*, n. sp., 98; *electalis*, 99; *farinalis*, 98; *manihotalis*, 99. Quaintance, A. L., Communications by, 2, 120. Racheospila centrifugaria, 35; *ocellata*, 34; *stellaria*, 35; *xysteraria*, 34. Reduviid, Swarming of a, 7. *Rhipidioides pectinicornis*, 163. Rohwer, S. A., and T. D. A. Cockerell, A new gall-making Coccid on *Atriplex*, 168. Rubber plant in Mexico injured by a scolytid, 123.

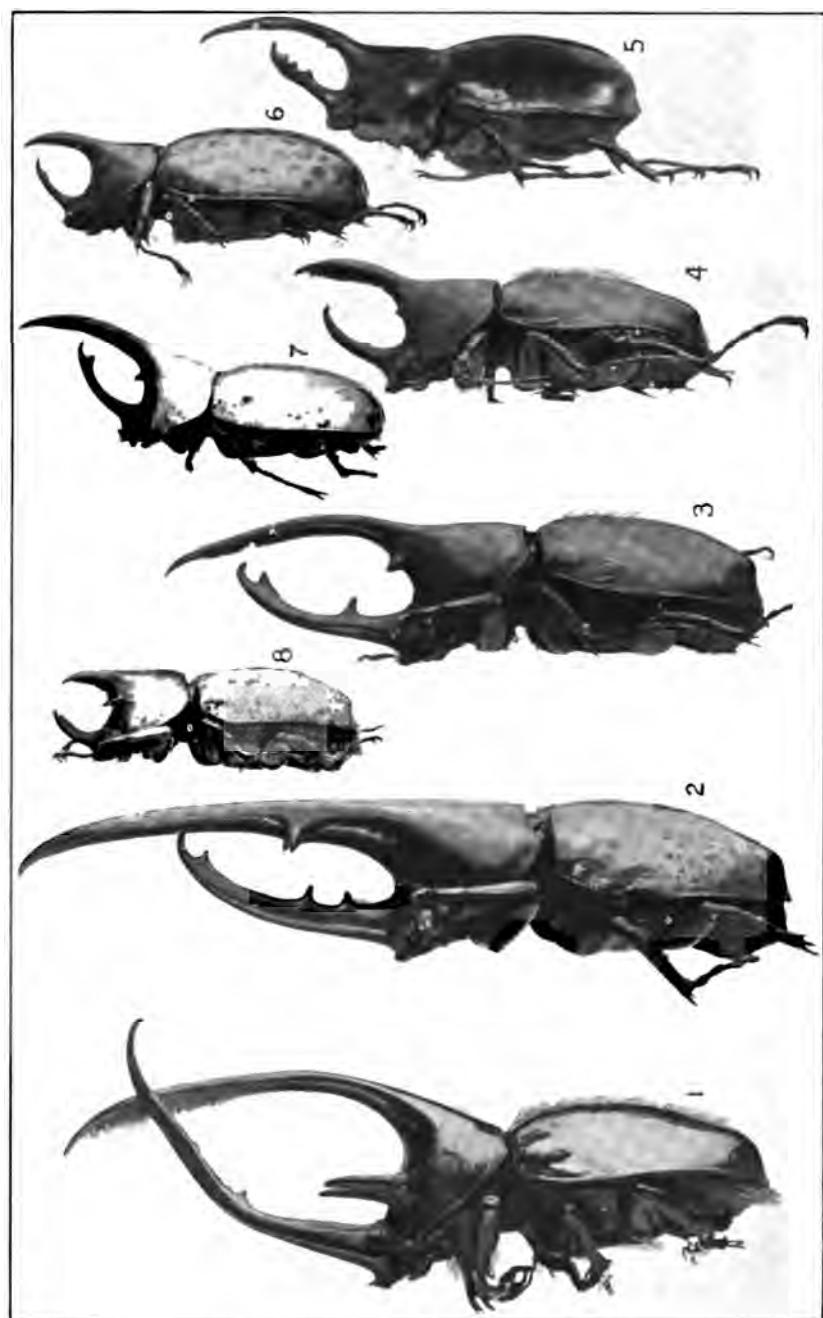
Sabulodes amplicineraria, 89; *dyari*, n. sp., 90; *ligata*, n. sp., 89.
Salebria ademptandella, n. sp., 114; *ochripunctella*, n. sp., 59; *rectistriella*, n. sp., 115; *robustella*, n. sp., 114.
Salobrena sincera, 93.
 Sanders, J. G., Communications by, 108, 109.
Sarata umbrella, n. sp., 59.
Satole, n. gen., 95; *ligniperdalis*, n. sp., 95.
 Saturnian moth, A new, from the Southwest, 82.
 Saw-fly larva killing willows, 10.
Sayomyia punctipennis, The early stages of, 36.
Schedius, 161.
 Schultz, Henry F., *Brassolis isthmia*, a lepidopterous insect highly injurious to cocoanut culture in the Panama Canal Zone, 164.
 Schwarz, E. A., Communications by, 5, 61, 62, 70, 71, 162.
 Scolytidae living in bark saturated with sea water, 18.
Scolytus rugulosus, 122.
Selidosema ethalodaria, n. sp., 57; *jacumbaria*, n. sp., 56.
 Service-berry moth, 120, 122.
Sibine apicalis, 48; sp., 48.
 Sloth moth, A further note on, 81.
 Smith, F. B., Communication by, 160.
Stenaspilates apapinaria, n. sp., 55.
 Stenomid moths, Two new, from the eastern United States, 111.
Stygnocoris rusticus, 14.
Synchlora cupidinaria, 34; *louisa*, 34; var. *hulstiana*, n. var., 35; *viridipurpurea*, 35.
Syntomaspis druparum, 108.
Talima straminea, 50.
Tanadema neutra, n. sp., 51.
Teratocoris herbaticus, 110.
Tetranychus opuntiae, n. sp., 36.
 Tetrastichus as a parasite of *Polygnotus*, 14.
Therina hyalinaria, n. sp. 88.
 Ticks, Three new, from the United States, 170; Parasites of, 119.
Timora toralis, 31.
 Timothy seeds infested by *Adistemia*, 3.
Tomicus celatus, 18; *decretus*, 18.
Tosale oviplagalis, 93.
Toxoptera graminum, 111, 163; Notes on, 11.
Trypoxyton albatarsis, 63.
Tyndarichus, 161.
 Urbahns, T. D., and E. O. G. Kelly, Experiments with *Lysiphlebus*, 163, 164.
Uscodya, n. gen., 101; *atalis*, n. sp., 102; *cestalis*, 102.
Valdivia mirabilicornella, n. sp., 60.
 Van Horn, R. W., Remarks by, 110.
 Washington Academy of Sciences, Intended publication of Bulletin, 6.
 Webb, J. L., Communications by, 119, 162.
 Webster, F. M., Note on *Adistemia watsonii* Woll., 3; Shorter remarks, 70, 73, 111.
 Wellman, F. C., On insect life in Portuguese West Africa, 157.
 Willis, B., Communication by, 109.
Xantippe descansalis, n. sp., 58, 94.
Xantippides, n. gen., 94; *descansalis*, 94.
Xanthorhoe planata, 83.
Zophodia bidentella, n. sp., 114.
 [Issued June 10, 1909.]

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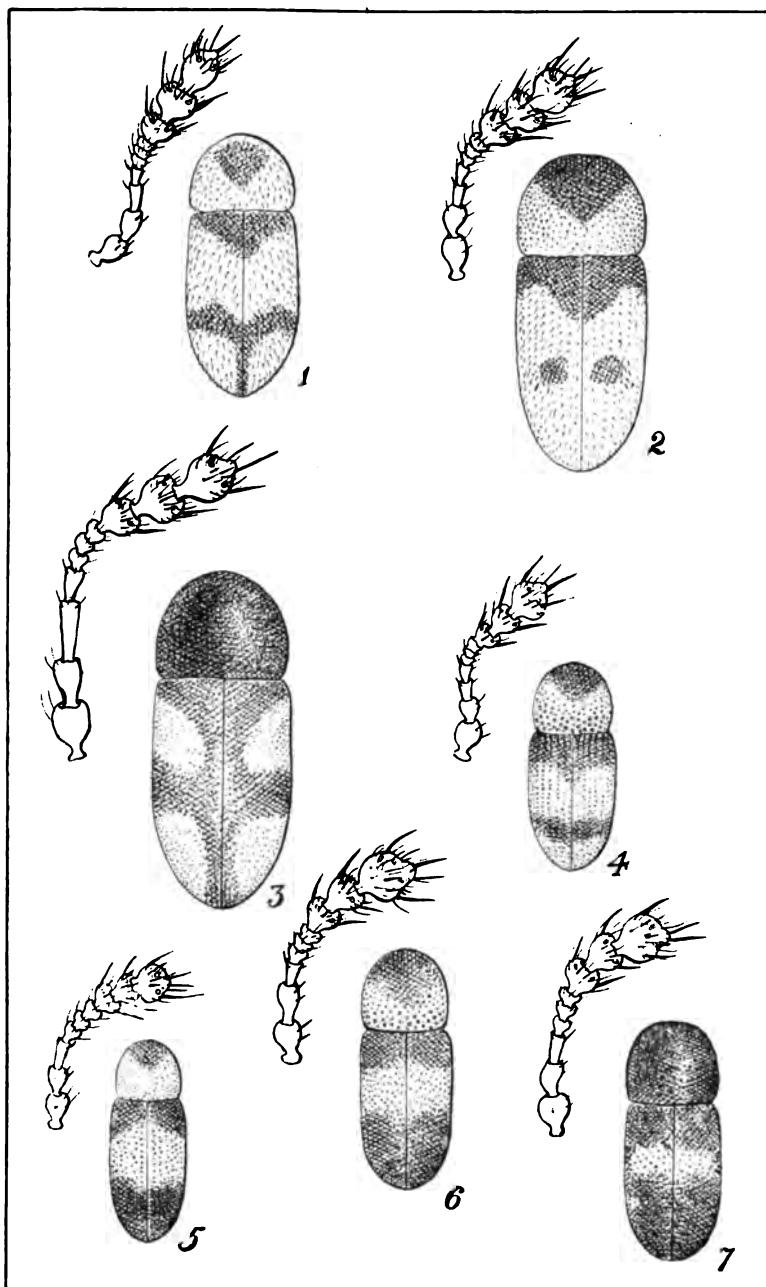
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TABLE OF CONTENTS OF THESE NUMBERS.

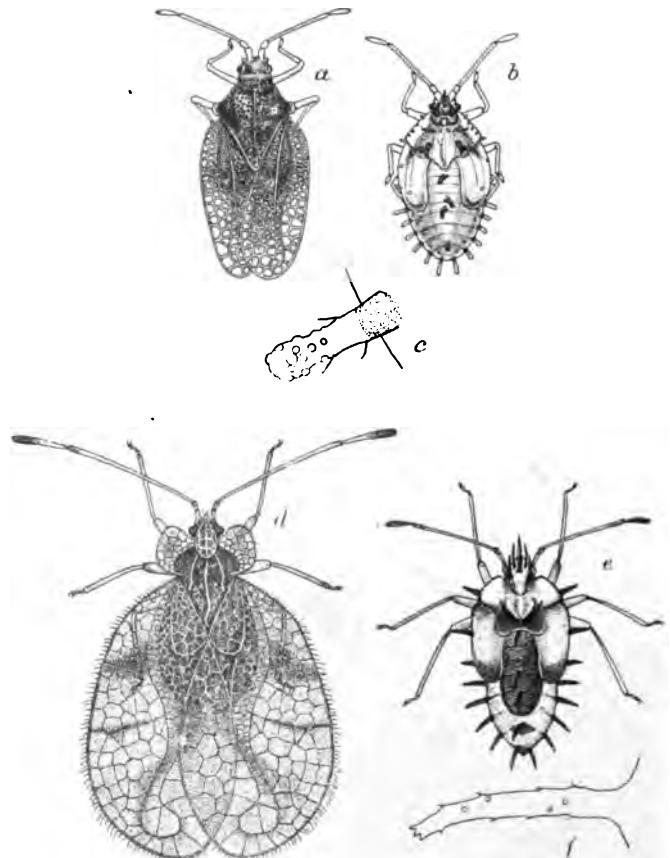
	PAGE
Obituary of WILLIAM HARRIS ASHMEAD.....	126
The entomological writings of WILLIAM HARRIS ASHMEAD, with an index to the new genera described by him.....	131
BANKS, NATHAN: Three new ticks from the United States.....	170
BUENO, J. R. DE LA TORRE, G. W. KIRKALDY AND: A catalogue of American aquatic and semiaquatic Hemiptera.....	173
COCKERELL, T. D. A.: A new coccid of the genus Eriococcus, 167; A new braconid of the genus Elasmosoma.....	168
COCKERELL, T. D. A., AND S. A. ROHWER: A new gall-making coccid on Atriplex.....	169
CRAWFORD, J. C.: The entomological writings of William Harris Ashmead, with an index to the new genera described by him..	131
DYAR, HARRISON G.: The larva of Lerina incarnata Walk.....	162
ELY, CHARLES R.: Descriptions of two new species of Acrobasis..	160
KIRKALDY, G. W., AND J. R. DE LA TORRE BUENO: A catalogue of American aquatic and semiaquatic Hemiptera.....	173
ROHWER, S. A., T. D. A. COCKERELL AND: A new gall-making coccid on Atriplex.....	169
SCHULTZ, HENRY F.: Brassolis isthmia, a lepidopterous insect highly injurious to cocoanut culture in the Panama Canal Zone. 164	



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